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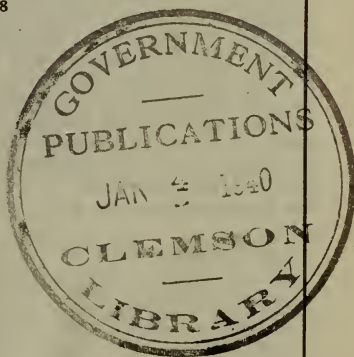
Administrative Report No. 34

PROPAGATION AND DISTRIBUTION
OF FOOD FISHES

FISCAL YEAR 1938

By GLEN C. LEACH, M. C. JAMES
and E. J. DOUGLASS

APPENDIX IV TO REPORT OF COMMISSIONER OF FISHERIES
FOR THE FISCAL YEAR 1938



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ADMINISTRATIVE REPORT SERIES

Since the advent of the Administrative Report Series, considerable confusion has arisen concerning its system of numbering the separates composing it. Inasmuch as the Reports of the Divisions vary in order from year to year, many have found their designations as "Appendix No. I, II, III, or IV" very confusing. To relieve this, it has been decided to number them as "Administrative Report No. —." Inasmuch as 20 separates had already been printed in this series before starting the numbers, it was deemed advisable to begin the numbering with Administrative Report No. 21. Of course, numbers cannot be printed on those already off the press, but for the information of those who wish to know what the first 20 were, they are numbered for filing purposes as follows:

- No. 1. Report, Commissioner of Fisheries, 1931.
- No. 2. Alaska Fishery and Fur-Seal Industries, 1930.
- No. 3. Fishery Industries of the United States, 1930.
- No. 4. Progress in Biological Inquiries, 1930.
- No. 5. Propagation and Distribution of Food Fishes, 1931.
- No. 6. Report Commissioner of Fisheries, 1932.
- No. 7. Alaska Fishery and Fur-Seal Industries, 1931.
- No. 8. Fishery Industries of the United States, 1931.
- No. 9. Progress in Biological Inquiries, 1931.
- No. 10. Propagation and Distribution of Food Fishes, 1932.
- No. 11. Alaska Fishery and Fur-Seal Industries, 1932.
- No. 12. Progress in Biological Inquiries, 1932.
- No. 13. Fishery Industries of the United States, 1932.
- No. 14. Propagation and Distribution of Food Fishes, 1933.
- No. 15. Fishery Industries of the United States, 1933.
- No. 16. Alaska Fishery and Fur-Seal Industries, 1933.
- No. 17. Progress in Biological Inquiries, 1933.
- No. 18. Propagation and Distribution of Food Fishes, 1934.
- No. 19. Alaska Fishery and Fur-Seal Industries, 1934.
- No. 20. Fishery Industries of the United States, 1934.

Note that the last Commissioner's Report was for 1932. Since then its place has been taken by a reprint from the Report of the Secretary of Commerce under the title "Bureau of Fisheries." Inasmuch as it is no longer a Bureau publication, it is not numbered; but it will be supplied to any who request the Report of the Commissioner for any year since 1932.

PROPAGATION AND DISTRIBUTION OF FOOD FISHES, FISCAL YEAR 1938¹

By GLEN C. LEACH, *Chief*, M. C. JAMES, *Assistant Chief*, and E. J. DOUGLASS, *Assistant Superintendent of Distribution, Division of Fish Culture*

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INTRODUCTION

The production of fish and eggs at Federal hatcheries during the fiscal year 1938 totaled 8,121,131,000. This was very close to the maximum production obtained in 1936 and was a moderate increase over the 1937 record. There are set forth elsewhere in this report the changes in methods and extension of facilities which contributed to this increase.

At no time since practical methods of artificial propagation of fish were developed has there been such a demand by the public for more and larger hatcheries. During this period there has been much critical analysis by biologists of the results obtained from fish-hatchery operations. These trends have resulted in a concerted effort to develop the most efficient and economical methods of conserving or increasing the fishery resources. Until such time as there is a clear-cut formula-

¹ Administrative Report No. 34, Appendix IV to the Report of the U. S. Commissioner of Fisheries for 1938. Approved for publication May 23, 1939.

tion of a precise program, it is necessary to view the hatcheries as an implement which has proved its effectiveness in a general way throughout a period of years.

Broadly speaking, the need for artificial propagation of fish increases as the artificial conditions of fish environment increase. For purposes of this discussion the outstanding element of artificiality may be considered as a concentrated pressure upon the fish stock by the increasing number of anglers or by more intensive commercial fishing. Hence, in many of the thickly populated States practically 100 percent of the take of game fish is of hatchery origin. Even in areas such as the national parks and national forests, there has been an equivalent concentration of angling even though the conditions of the waters themselves have remained virtually unchanged.

The popularization of recreation in many areas has been, in part, based upon an angling pressure far beyond the normal capacity of the streams and lakes to supply. Consequently, the normal, unimpaired productivity of such waters has had to be augmented by stocking.

The other elements of artificiality which have imposed a constantly increasing need for stocking are soil erosion, deforestation, pollution, and the introduction of structures alien to the natural watercourses, such as flood-control, hydroelectric, and storage dams.

The ultimate benefits to be derived from hatchery operations are as much dependent upon the intelligent use of their production as upon the efficiency with which the hatcheries are operated and the number of fish hatched and reared each season. Consequently, the most fertile field for improvement lies in a better control of stocking procedure.

An interesting aspect of hatchery activities lies in the vague distinction as between game and commercial species. It would be highly desirable if this report could show an analysis, for the benefit of both the sport fishermen and the commercial fishermen, of the production of these two classes of fish. We are at a loss, however, to draw any sharp line of distinction because of the fact that practically all varieties handled at the hatcheries are, under some conditions, sought by the anglers. Even the cod, haddock, flatfish, and pollock are the basis of sport-fishing activities carried on from party boats. It might be said that, out of the 48 species handled, only the lobster, whitefish, lake and glut herring, and two species of Pacific salmon, are completely ignored by sport fishermen. It has, therefore, been virtually impossible to analyze the records of hatchery production so as to show the actual contribution to that portion of the public which fishes for recreation, and to the much smaller group which fishes for a livelihood.

SPECIES PROPAGATED

During the year 1938 there were 48 separate species handled at Federal hatcheries, in comparison with 46 species during the previous year. These include the most important game and panfishes, which are foremost in the angler's mind, as well as a number of commercial fish which are most amenable to artificial propagation. Pink, or humpback salmon were propagated for the first time since 1934. Due to unfavorable conditions at the Woods Hole, Mass., station no mackerel eggs were collected this season. With the cooperation of the Montana Fish and Game Department, this Bureau was able to

secure a limited number of landlocked sockeye salmon eggs for hatching.

The following list gives the common and scientific designation of the species propagated.

Catfishes (*Siluridae*):

Catfish (*Leptops olivaris*).

Spotted channel catfish (*Ictalurus punctatus*).

Bullhead (*Ameiurus nebulosus*).

Carp (*Cyprinidae*): Common carp (*Cyprinus carpio*).

Buffalofish (*Catostomidae*): Common buffaloes (*Ictiobus* sp.).

Shad and herring (*Clupeidae*):

Shad (*Alosa sapidissima*).

Glut herring (*Pomolobus aestivalis*).

Salmons, trouts, and whitefishes (*Salmonidae*):

Common whitefish (*Coregonus clupeaformis*).

Lake herring, cisco (*Leucichthys* sp.).

Chinook, king, or quinnat salmon (*Oncorhynchus tshawytscha*).

Chum salmon (*Oncorhynchus keta*).

Coho salmon, silver salmon (*Oncorhynchus kisutch*).

Red salmon, sockeye, or blueback salmon (*Oncorhynchus nerka*).

Pink or humpback salmon (*Oncorhynchus gorbuscha*).

Landlocked sockeye salmon, silver trout (*Oncorhynchus kennerlyi*).

Steelhead trout (*Salmo gairdneri*).

Atlantic salmon (*Salmo salar*).

Landlocked salmon (*Salmo sebago*).

Rainbow trout (*Salmo irideus*).

Black-spotted trout, redthroat trout (*Salmo lewisi*).

Brown or Loch Leven trout (*Salmo fario* var.).

Lake trout, mackinaw trout (*Cristivomer namaycush*).

Brook trout (*Salvelinus fontinalis*).

Golden trout (*Salmo aqua-bonita*).

Grayling (*Thymallidae*): Montana grayling (*Thymallus montanus*).

Pikes (*Esoidae*): Pike and pickerel (*Esox* sp.).

Sunfishes (*Centrarchidae*):

Crappie (*Pomoxis annularis* and *P. sparoides*).

Largemouth black bass (*Micropterus salmoides*).

Smallmouth black bass (*Micropterus dolomieu*).

Rock bass (*Ambloplites rupestris*).

Warmouth bass (*Chaenobryttus gulosus*).

Bluegill sunfish (*Lepomis incisor*).

Green sunfish (*Lepomis cyanellus*).

Redbreasted bream (*Lepomis auritus*).

Red-eared sunfish (*Lepomis heros*).

Common sunfish (*Lepomis gibbosus*).

Mojarras de rio (*Cichlidae*).

Rio Grande perch (*Herichthys cyanoguttatus*).

Perches (*Percidae*):

Pike perch (*Stizostedion vitreum*).

Yellow perch, ringed perch (*Perca flavescens*).

White basses (*Serranidae*):

White bass (*Roccus chrysops*).

Striped bass (*Roccus saxatilis*).

White perch (*Morone americana*).

Drums (*Sciaenidae*): Fresh-water drum, lake sheepshead (*Aplodinotus grunniens*).

Cods (*Gadidae*):

Cod (*Gadus callarias*).

Haddock (*Melanogrammus aeglefinus*).

Pollock (*Pollachius virens*).

Flounders (*Pleuronectidae*): Winter flounder (*Pseudopleuronectes americanus*).

Lobster (*Homaridae*): Lobster (*Homarus americanus*).

Summary, by species, of the output of fish and fish eggs during the fiscal year ending June 30, 1938

Species	Eggs	Fry	Fingerlings	Total
Catfish			28,468,960	28,468,960
Buffalofish	387,445,000		3,211,300	390,656,300
Carp	329,200,000		2,714,200	331,914,200
Shad		26,140,940		26,140,940
Whitefish	480,000	74,550,000		75,030,000
Lake herring		1,400,000		1,400,000
Glut herring		1,370,000		1,370,000
Striped bass		415,000		415,000
Chinook salmon	3,005,000	22,608,150	14,065,565	39,678,715
Chum salmon	5,070,000	6,370,390		11,440,390
Silver salmon		450,050	492,370	942,420
Humpback salmon		4,584,000		4,584,000
Sockeye salmon	100,000		2,929,505	3,029,505
Sockeye salmon (landlocked)			401,200	401,200
Atlantic salmon			70,500	70,500
Landlocked salmon			48,245	48,245
Steelhead trout	141,000		1,498,615	1,639,615
Rainbow trout	9,242,140	169,100	9,105,970	18,517,210
Black-spotted trout	23,873,940	2,719,620	15,033,450	41,627,010
Loch Leven trout			2,128,835	2,128,835
Lake trout	216,320	1,163,000	135,500	1,514,820
Brook trout	18,866,050	1,647,000	14,577,340	35,090,390
Golden trout			255	255
Grayling	2,785,300	3,364,700	75,345	6,225,345
Pike and pickerel			48,265	48,265
Crappie			7,091,745	7,091,745
Black bass, largemouth		1,431,800	6,504,410	7,936,210
Black bass, smallmouth		1,399,000	325,625	1,724,625
Rock bass			116,080	116,080
Warmouth bass			64,140	64,140
Sunfish			9,457,050	9,457,050
Pike perch			137,520,000	137,520,000
Yellow perch		329,475,000	159,805	329,634,805
Fresh-water drum			435	435
White bass			45,895	45,895
White perch		4,480,000	850	4,480,850
Miscellaneous fishes			412,350	412,350
Cod	2,174,601,000	152,465,100		2,327,066,100
Haddock	924,933,000	39,287,000		964,220,000
Flatfish	270,670,200	1,010,624,000		1,281,294,200
Pollock	1,761,951,000	257,399,000		2,019,350,000
Lobster		8,334,480		8,334,480
Total	5,912,579,950	2,089,367,330	119,184,705	8,121,131,985

PRODUCTION

Inasmuch as the total output of eggs and fish varied but slightly from the figure for the previous year, there was relatively little difference in the comparable production of the individual species. The trend of increase in the production of marine commercial species of New England—cod, haddock, pollock, and lobster—has continued.

Other commercial species handled in increased numbers were the shad, lake herring, and buffalofish. The output of all species of Pacific salmon was at a lower level, which accounted, in part, for a reduction in the distribution of fish of the fingerling size. There was a slight increase in the distribution of steelhead trout, so popular on the Pacific coast.

The production of largemouth and smallmouth bass, approaching 70 million fish, exceeded all previous records for these species. The aggregate number of trout and trout eggs, which contributed to the development of good angling, was 99 million. Grouping the so-called "panfishes" with the strictly game varieties, there was a total production of 131½ million fish of a noncommercial type.

While this report emphasizes the number of fish and eggs produced, there has been an unremitting effort to maintain the existing high quality of stock.

CONSTRUCTION ACTIVITIES

Major construction activities were concerned with the establishment of four new hatcheries, as authorized by the act of May 21, 1930. The 1938 appropriations act carried an item of \$155,000 for this purpose. The new hatcheries were, by law, allocated to the States of Florida, Nevada, Georgia, and Mississippi. After a careful preliminary survey the Secretary of Commerce approved locations at Marianna, Fla., Las Vegas, Nev., Cohutta, Ga., and Lyman, Miss.

The delay incident to acquiring title to the sites deferred the starting of actual construction until late in the year and none of the establishments were completed at the close of the year. However, a limited number of fish were produced at Lyman, Miss. The Nevada project consisted of a small hatchery which had been previously operated by the city of Las Vegas. This was donated to the Bureau and a program of enlargement and improvement was undertaken. One other site was also acquired by donation. All hatcheries were developed to the point where they were in readiness for some fish production during the fiscal year 1939. All of these hatcheries will produce warm-water species.

At Carson, Wash., the development of a trout and salmon hatchery, started in the fiscal year 1938, was continued until the exhaustion of available funds. A hatchery, service buildings, water-supply system, and several dwellings for personnel were provided, leaving a further need for rearing ponds.

During the year the Farm Security Administration transferred to the Bureau of Fisheries a site at Arcadia, R. I., for development as a bass hatchery. Preliminary development work on a cooperative basis with the Farm Security Administration was undertaken, but the major part of the construction remained to be done during the succeeding fiscal year.

Some repairs and improvements at the older hatcheries were effected by the setting up of local W. P. A. projects. The most important of these were for the complete rehabilitation of the Hartsville, Mass., and the White Sulphur Springs, W. Va., stations. By the utilization of funds from the regular appropriations as a sponsor's contribution, it is possible to carry out extensive improvements under such procedure.

At the close of the fiscal year there had been approved an allocation of \$808,500 from the Public Works Administration, and \$500,050 from the Works Progress Administration. These amounts, which were to be disbursed by the Bureau, covered a broad program of improvement and enlargement at practically all of the hatcheries, the purpose being to put all of the properties in the best possible physical condition and thus add materially to their operating efficiency. No work had started on these projects at the close of the fiscal year.

COOPERATION WITH OTHER CONSERVATION AGENCIES

Among the administrative procedures most valuable in conducting the Federal fish-cultural activities may be listed the cooperative relations existing with other agencies working in the same field. No other Federal agency has the responsibility of operating hatcheries, but numerous bureaus of the Federal Government administer lands and waters which receive the output of the hatcheries maintained by this Bureau.

Such agencies as the Forest Service, National Park Service, Bureau of Reclamation, Office of Indian Affairs, and various other land-administering units, have encountered problems in fish management and stocking in areas under their control.

Whether or not formal agreements of cooperation, such as have been drawn up with the Forest Service and the Tennessee Valley Authority, have been put into effect, the Bureau has contributed to the solution of these problems. The Division of Fish Culture assisted the T. V. A. in the preparation of plans for a large hatchery on the Elk River in Alabama and at the close of the year construction operations were being started. Upon completion, this unit is to be operated by this Bureau.

In the Chattahoochee National Forest a very complete trout-rearing unit was constructed by the Forest Service and turned over to the Bureau of Fisheries for operation. Several similar establishments are operated in other national forests, generally on a seasonal basis. In the general distribution from regular hatcheries special attention has been given to the requirements of the Forest Service.

Late in the fiscal year the Forest Park Hatchery, located in the municipal park system of the city of St. Louis, was abandoned by the State Conservation Department due to insufficient funds for its operation. The Bureau was requested to take it over temporarily under agreement with the city. An experienced fish culturist was assigned to take charge and a successful hatching season resulted, although the greater part of the fingerling bass, panfish, and other species were retained for later distribution. The Bureau has also maintained a man at a State hatchery located at Palestine, W. Va. Lobster culture at the Bureau's Gloucester, Mass., station was conducted in cooperation with the State Division of Marine Fisheries and plans are being developed for a comparable effort in lobster culture jointly with the State of Maine.

The Bureau prepared plans for the development of a bass hatchery at Inks Dam, Tex., on the lower Colorado River. The site was made available by the Lower Colorado River Authority, with the labor to be furnished by the National Youth Administration. Active development work was starting at the close of the year, with the intent that the establishment would be operated by the Bureau upon completion.

A similar establishment was in process of construction at Elephant Butte Dam, N. Mex., the sponsoring agency being the Bureau of Reclamation, with labor furnished by the Civilian Conservation Corps.

As heretofore, the closest contact with the State fish and game departments has been in the distribution of the hatchery output and in the exchange of eggs. The fact that, as a general rule, the public recognizes no distinction between State and Federal hatcheries and their activities, is indicative of the high degree of unity which has been achieved.

The Bureau's contacts with private and semipublic sportsmen's and conservation organizations have been largely in the nature of direct services. Such organizations have been recipients of large numbers of fish for stocking and have been furnished with technical advice when needed. As an example, there may be cited the hatchery development at Carpenters Brook, Onondaga County, N. Y. Local sportsmen enlisted the aid of the county authorities and county funds

were used as a sponsor's contribution for the setting up of a W. P. A. project. This is resulting in the establishment of a first-class trout and bass hatchery, for which the Bureau is supplying eggs and fish, as well as technical operating guidance. The existing establishment at Rochester, N. Y., has served as a successful model for the newer project.

Field employees of the Division of Fish Culture have been inculcated with a will to cooperate and this attitude has been largely reciprocated. An exhaustive itemization of all phases in which coordination has resulted in efficiency and economy would be too extensive for treatment in this report.

SALVAGE OPERATIONS

Rescue crews were sent into the field at five different points within the territory of the Upper Mississippi Wild Life Refuge for the purpose of salvaging fish stranded in sloughs. In handling 43,194,485 fish the collections were approaching the normal average of preceding years, although the scope of the work is being progressively reduced by the development of the area for navigation. Approximately 1.2 percent of the fish rescued were utilized for general distribution, the remainder being returned directly to the Mississippi River. The requirements for distribution in interior waters were largely met from the production of propagating ponds of a semiartificial nature.

Several carloads of the rescued fish were assigned to the State of North Dakota for the purpose of stocking new lakes and reservoirs. The State defrayed the transportation charges. As the character of the Upper Mississippi Wild Life Refuge has changed through improvement of navigation facilities, there has been corresponding change in the fisheries' administrative problems. The period of survey and salvage activities has largely passed, and future work will be directed toward the development of propagating ponds, several of which can be advantageously located immediately below the navigation dams.

Number and disposition of fish rescued, fiscal year 1938

Locality and species	Delivered to applicants	Restored to original waters	Total number of fish
All stations:			
Black bass.....	136, 235	318, 025	454, 260
Crappie.....	141, 310	6, 104, 450	6, 245, 760
Sunfish.....	185, 245	3, 885, 350	4, 070, 595
Catfish.....	52, 620	25, 594, 220	25, 646, 840
Yellow perch.....	4, 925	77, 560	82, 485
Pike-pickerel.....		45, 265	45, 265
Carp.....		2, 708, 900	2, 708, 900
Buffalofish.....		3, 155, 700	3, 155, 700
White bass.....		77, 895	77, 895
Drum.....		435	435
Miscellaneous fishes.....		706, 350	706, 350
Total.....	520, 335	42, 674, 150	43, 194, 485
Summary by stations:			
Marquette, Iowa.....	325, 865	25, 006, 450	25, 332, 315
Bellevue, Iowa.....	20, 880	9, 384, 555	9, 405, 435
La Crosse, Wis. (Genoa).....	27, 250		27, 250
Fairport, Iowa.....		992, 720	992, 720
Lynxville, Wis.....	78, 415	6, 968, 850	7, 047, 265
Homer, Minn.....	67, 925	321, 575	389, 500
Total.....	520, 335	42, 674, 150	43, 194, 485

ASSIGNMENTS OF FISH AND FISH EGGS TO STATES, TERRITORIES, AND FOREIGN COUNTRIES

Six foreign countries and the Territory of Puerto Rico were the recipients of fish or fish eggs produced at Bureau hatcheries. Each year there are requests for the acclimatization of American food and game fishes in foreign countries. A number of the shipments referred to in table 3 were in continuation of programs previously started. The Bureau has for several years supplied raw material in the form of fish eggs or fingerling fish for the hatchery operated by the Puerto Rican Department of Agriculture. Rainbow eggs shipped to Venezuela were to augment a previous consignment from which a large part of the fish were lost after their successful hatching in Venezuela.

It will be noted that the rainbow trout was the most popular species, due to the hardiness and adaptability of this member of the trout family.

Both the Mexican and Argentine Governments now operate their own hatchery facilities and the egg shipments made by the Bureau were as a measure of cooperation with these countries. Lake-trout eggs were shipped to Switzerland a number of years ago and their successful development in certain Alpine lakes prompted the Swiss Government to request a further consignment. The assignment of one-half million brook-trout eggs to Canada was on an exchange basis, since the Bureau was the recipient of an equal number of lake-trout eggs in compensation.

The problems attending foreign shipments of eggs and fish, particularly to distant points, are many, but it is believed, particularly in the case of the American republics, that the special effort required is justified as a step toward better international understanding.

Assignments of fish and fish eggs to State fish commissions, fiscal year 1938

States and species	Eggs	Fry	Fingerlings, etc.	Total
Alabama:				
Black bass, largemouth			6, 475	6, 475
Sunfish			214, 130	214, 130
Arizona:				
Black-spotted trout	500, 000			500, 000
Steelhead trout	15, 000			15, 000
Black bass			33, 000	33, 000
Sunfish			17, 000	17, 000
Catfish			2, 300	2, 300
Arizona:				
Black bass, largemouth			22, 000	22, 000
Black bass, smallmouth		70, 000		70, 000
Sunfish			73, 500	73, 500
California: Chum salmon	200, 000			200, 000
Connecticut:				
Rainbow trout	50, 000			50, 000
Black bass, smallmouth		416, 000		416, 000
Georgia:				
Brook trout	25, 000			25, 000
Rainbow trout	275, 000			275, 000
Black bass, largemouth			1, 000	1, 000
Illinois:				
Black bass, largemouth			16, 000	16, 000
Rock bass			4, 000	4, 000
Sunfish			20, 000	20, 000
Idaho:				
Black-spotted trout	500, 000		55, 000	555, 000
Rainbow trout			209, 200	209, 200
Brook trout			15, 000	15, 000
Grayling	500, 300			500, 300

Assignments of fish and fish eggs to State fish commissions, fiscal year 1938—Contd.

States and species	Eggs	Fry	Fingerlings, etc.	Total
Indiana:				
Brook trout			58,275	58,275
Loch Leven trout			8,000	8,000
Rainbow trout			45,675	45,675
Black bass, largemouth			10,250	10,250
Black bass, smallmouth			16,650	16,650
Sunfish			54,125	54,125
Crappie			1,235	1,235
Iowa:				
Brook trout	10,000		18,000	28,000
Loch Leven trout			3,000	3,000
Rainbow trout	66,000			66,000
Black bass, largemouth			22,880	22,880
Sunfish			4,000	4,000
Kentucky: Black bass, smallmouth		96,000	500	96,500
Maryland:				
Black bass, largemouth			22,900	22,900
Sunfish			4,500	4,500
Crappie			2,400	2,400
Yellow perch		844,000		844,000
Massachusetts:				
Brook trout			40,000	40,000
Rainbow trout	175,000			175,000
Michigan:				
Brook trout			125	125
Rainbow trout	401,100			401,100
Minnesota: Black bass, largemouth			108,000	108,000
Mississippi: Sunfish			6,200	6,200
Missouri: Black bass, smallmouth		145,000		145,000
Montana:				
Black-spotted trout	3,112,900			3,112,900
Brook trout			71,000	71,000
Grayling			23,130	23,130
Black bass, largemouth			38,060	38,060
Sunfish			325	325
Catfish			54,295	54,295
Crappie			17,750	17,750
Nevada: Rainbow trout	400,720			400,720
New Hampshire: Brook trout	1,700,000		100,000	1,800,000
New Mexico:				
Black-spotted trout	1,500,000			1,500,000
Catfish			1,300	1,300
Crappie			700	700
Black bass, largemouth			343,000	343,000
Chum salmon	400,600			400,600
New York:				
Lake trout	51,000			51,000
Rainbow trout			2,500	2,500
North Carolina:				
Brook trout			89,950	89,950
Rainbow trout	100,000			100,000
Sunfish			36,150	36,150
North Dakota:				
Black bass, largemouth			28,175	28,175
Sunfish			19,510	19,510
Crappie			26,375	26,375
Oklahoma: Black bass, largemouth			5,000	5,000
Oregon:				
Black-spotted trout	2,000,000			2,000,000
Steelhead trout			305,000	305,000
Chinook salmon			78,000	78,000
Chum salmon	800,000			800,000
Silver salmon			54,000	54,000
Grayling	250,100			250,100
Rhode Island:				
Brook trout	100,000			100,000
Flounder		68,272,000		68,272,000
South Carolina:				
Rainbow trout	165,000			165,000
Black bass, largemouth			9,200	9,200
Sunfish			300	300
South Dakota:				
Rainbow trout			36,000	36,000
Black bass, largemouth			20,180	20,180
Sunfish			20,700	20,700
Catfish			10,700	10,700
Crappie			15,200	15,200
Tennessee: Rainbow trout	75,000			75,000
Utah:				
Chum salmon	500,000			500,000
Grayling	1,300,000			1,300,000

Assignments of fish and fish eggs to State fish commissions, fiscal year 1938—Contd.

States and species	Eggs	Fry	Fingerlings, etc.	Total
Vermont:				
Brook trout	1,500,000			1,500,000
Loch Leven trout			1,800	1,800
Rainbow trout			7,830	7,830
Black bass, smallmouth		30,000		30,000
Virginia: Rainbow trout			253,000	253,000
Washington:				
Black-spotted trout	700,000			700,000
Brook trout			17,000	17,000
Rainbow trout			53,500	53,500
West Virginia:				
Brook trout			659,125	659,125
Loch Leven trout			78,500	78,500
Rainbow trout			412,000	412,000
Black bass, largemouth			12,500	12,500
Black bass, smallmouth			10,000	10,000
Wisconsin: Rainbow trout	50,000			50,000
Wyoming:				
Black-spotted trout	1,600,000			1,600,000
Brook trout			17,400	17,400
Lake trout	52,820			52,820
Rainbow trout			12,900	12,900
Total	19,074,940	69,873,000	4,062,375	93,010,315

The Bureau has been able to assign eggs, fry, and fish to several of the States. By such arrangement the activities of the State hatcheries are greatly benefited. Many of the assignments shown in the table above were not, of course, outright donations, but were transfers which made it possible for Bureau applications to be filled from State hatcheries, and the cost of distribution was thereby reduced.

The comparatively large assignments of rainbow-trout eggs, fingerlings, etc., were due to the fact that the Bureau is the principal source of supply of eggs from the fall-spawning strain. These eggs are in great demand because of the fact that their early hatching results in much larger fish for distribution during the spring months.

The total number of our assignments was somewhat below the record of the previous year, due, among other reasons, to the failure of our supply of Loch Leven trout eggs.

Shipments of fish and fish eggs to foreign countries, fiscal year 1938

Countries and species	Eggs	Fingerlings, etc.	Total
Puerto Rico:			
Bream		600	600
Catfish		975	975
Rainbow trout	250,000		250,000
Venezuela: Rainbow trout	100,000		100,000
Trinidad: Rainbow trout	35,000		35,000
Switzerland: Lake trout	75,000		75,000
Mexico: Rainbow trout	218,000		218,000
Argentina: Rainbow trout	105,000		105,000
Canada: Brook trout	500,000		500,000
Total	1,283,000	1,575	1,284,575

TRANSFER OF EGGS BETWEEN STATIONS

As equipment is transferred between the various units of the Bureau's hatchery system for the purpose of more effective utilization, so are surplus eggs of one hatchery shipped for incubation at

other points. Natural conditions favor the production of eggs of certain species of trout at certain hatcheries, and economy requires that these favoring circumstances be taken advantage of. Such shifting of the egg supply is also considered a measure of distribution, since eggs can be shipped for a long distance quite economically, whereas the transportation of fish of a stocking size might represent an expenditure of hundreds of dollars.

Transfer of eggs between stations, fiscal year 1938

Species	Number of eggs	From—	To—
Black-spotted trout.....	100, 170	Saratoga, Wyo.....	Springville, Utah.
	1, 850, 000	Yellowstone Park, Wyo.....	Bozeman, Mont.
	2, 100, 000	do.....	Springville, Utah.
	800, 000	do.....	Leadville, Colo.
	200, 000	do.....	Hagerman, Idaho.
	400, 000	do.....	Ennis, Mont.
	50, 000	do.....	Spearfish, S. Dak.
	100, 000	do.....	Clackamas, Oreg.
	600, 000	do.....	Birdsview, Wash.
	400, 000	do.....	Saratoga, Wyo.
	1, 364, 000	do.....	Jackson, Wyo.
	150, 000	do.....	Eagle Nest, N. Mex.
	1, 400, 000	do.....	Glacier Park, Mont.
	200, 000	do.....	Mount Rainier, Wash.
	200, 000	do.....	Quilcene, Wash.
	800, 000	do.....	Quinault, Wash.
	100, 000	do.....	Spokane, Wash.
	100, 000	do.....	Salmon, Idaho.
	500, 000	Craig Brook, Maine.....	Cape Vincent, N. Y.
	200, 000	do.....	Erwin, Tenn.
	350, 000	do.....	White Sulphur Springs, W. Va.
	250, 000	do.....	Smokemont, N. C.
	250, 000	do.....	Hartsville, Mass.
	400, 000	do.....	Wytheville, Va.
	78, 000	do.....	Northville, Mich.
	700, 000	Leadville, Colo.....	Saratoga, Wyo.
	200, 000	do.....	Manchester, Iowa.
	300, 000	do.....	Springville, Utah.
	100, 000	do.....	Clackamas, Oreg.
	101, 000	do.....	Crawford, Nebr.
	75, 000	do.....	Duluth, Minn.
	65, 000	do.....	Eagle Nest, N. Mex.
	300, 000	Creede, Colo.....	Spearfish, S. Dak.
	204, 000	do.....	Bear Lake, Utah.
	400, 000	do.....	Northville, Mich.
	300, 000	do.....	Bozeman, Mont.
	369, 000	do.....	Crawford, Nebr.
	656, 000	do.....	Springville, Utah.
	502, 000	do.....	La Crosse, Wis.
	229, 000	do.....	Duluth, Minn.
	500, 000	National Forest of New Hampshire.	Wytheville, Va.
Brook trout.....	515, 000	do.....	Nashua, N. H.
	300, 000	do.....	Cape Vincent, N. Y.
	792, 000	do.....	White Sulphur Springs, W. Va.
	300, 000	do.....	Duluth, Minn.
	400, 000	do.....	La Crosse, Wis.
	608, 000	do.....	Leetown, W. Va.
	1, 541, 850	do.....	St. Johnsbury, Vt.
	10, 000	do.....	Lake Mills, Wis.
	200, 000	do.....	Northville, Mich.
	100, 000	do.....	Manchester, Iowa.
	100, 000	do.....	Craig Brook, Maine.
	500, 000	do.....	Erwin, Tenn.
	500, 000	do.....	Walhalla, S. C.
	200, 000	do.....	Cortland, N. Y.
	200, 000	do.....	Barneveld, N. Y.
	100, 000	Hagerman, Idaho.....	Saratoga, Wyo.
	100, 000	do.....	Springville, Utah.
	287, 900	Eagle Nest, N. Mex.....	Leadville, Colo.
	333, 200	Neosho, Mo.....	Creede, Colo.
	523, 400	do.....	Bozeman, Mont.
	715, 500	do.....	Saratoga, Wyo.
	294, 000	do.....	Crawford, Nebr.
Rainbow trout.....			

Transfer of eggs between stations, fiscal year 1938—Continued

Species	Number of eggs	From—	To—
Rainbow trout—Continued.	50,000	Springville, Utah	Birdsview, Wash.
	100,000	do	Quinault, Wash.
	100,000	do	Bear Lake, Utah.
	300,000	do	Spokane, Wash.
	300,000	do	Carson, Wash.
	50,000	White Sulphur Springs, W. Va.	Hartsville, Mass.
	505,000	do	Walhalla, S. C.
	50,000	do	Nashua, N. H.
	30,000	do	Smokemont, N. C.
	50,000	do	Craig Brook, Maine.
	175,000	Wytheville, Va.	Cortland, N. Y.
	450,000	do	Smokemont, N. C.
	150,000	do	Barneveld, N. Y.
	229,900	Yellowstone Park, Wyo.	Ennis, Mont.
	250,000	do	Glacier Park, Mont.
Steelhead trout	20,000	Birdsview, Wash.	Berlin, N. H.
	31,000	do	Salmon, Idaho.
Lake trout	30,000	Cape Vincent, N. Y.	Cortland, N. Y.
	37,000	do	Craig Brook, Maine.
Grayling	500,000	Yellowstone Park, Wyo.	Springville, Utah.
	500,000	do	Ennis, Mont.
	250,100	do	Bozeman, Mont.
Chum salmon	200,000	Quinault, Wash.	Birdsview, Wash.

STATION OUTPUT

There has been a continuation of the development of new fish-cultural facilities, and the 1938 output was obtained from a total of 49 main stations and 43 substations. Among the units which contributed for the first time to the distribution listing were the establishments at Carson, Wash.; Elephant Butte, N. Mex.; and Forest Park, St. Louis, Mo. The Pisgah Forest, N. C., station, which is a fully equipped rearing unit, also entered into production for the first time. The output of the Rochester, N. Y., cooperative establishment is likewise listed because of the fact that the Bureau is responsible for the operations of this establishment.

The San Angelo, Tex., station produced 102,000 pondfish in its first season's activity. The Walhalla, S. C., station did not hatch any trout but, from fingerlings transferred there for rearing, a distribution of 77,000 fish was obtained. Although the Bureau took over the Welaka, Fla., station virtually at the onset of the spawning season, it was, nevertheless, possible to achieve a distribution of 300,000 largemouth bass before the close of the year.

Fish-cultural work was discontinued at Lakeland, Vt., where formerly pike perch and yellow perch had been propagated in cooperation with the State of Vermont.

The Bureau has followed the practice of listing as distributed all fish which were transferred from its hatcheries to rearing units operated by private organizations or by States. When fish have been transferred to the Forest Service rearing projects, where the Bureau maintains a measure of supervision and actively participates in the distribution, the production figures are those which cover the actual number of large fingerlings planted at the close of the rearing season. It has been found impracticable to attempt to follow through to the ultimate stocking performed from rearing projects which are supervised by agencies other than the Bureau.

It is timely to repeat a statement which has appeared in previous Divisional reports relative to the distribution of carp. All carp eggs

which the Bureau's hatcheries handle are secured in sections where there is an active commercial fishery for this species and they are not distributed elsewhere.

Stations and substations operated and the output of each, fiscal year 1938

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
<i>Birdsview, Wash.:</i>				
Black-spotted trout			296,000	296,000
Brook trout			326,500	326,500
Rainbow trout			75,650	75,650
Chinook salmon			102,000	102,000
Humpback salmon		3,864,000		3,864,000
Silver salmon		44,000	222,000	266,000
Sockeye salmon	100,000		326,200	426,200
Steelhead trout	141,000		665,000	806,000
<i>Mt. Rainier, Wash.:</i>				
Black-spotted trout			317,000	317,000
Brook trout			337,665	337,665
Golden trout			255	255
Rainbow trout			109,590	109,590
Steelhead trout			72,000	72,000
<i>Spokane, Wash.:</i>				
Black-spotted trout			30,000	30,000
Brook trout			35,000	35,000
Rainbow trout			98,400	98,400
<i>Boothbay Harbor, Maine:</i>				
Cod	573,913,000			573,913,000
Flatfish		534,600,000		534,600,000
Haddock	135,290,000			135,290,000
Lobster		7,151,150		7,151,150
<i>Bozeman, Mont.:</i>				
Black-spotted trout	15,000		2,979,825	2,994,825
Brook trout			484,865	484,865
Loch Leven trout			17,250	17,250
Rainbow trout			440,550	440,550
Grayling		6,000	57,985	63,985
<i>Ennis, Mont.:</i>				
Black-spotted trout		531,800	455,675	987,475
Loch Leven trout			827,640	827,640
Rainbow trout			994,325	994,325
Grayling		496,200	7,360	503,560
<i>Glacier Park, Mont.:</i>				
Black-spotted trout		1,454,820	402,980	1,857,800
Rainbow trout		169,100		169,100
<i>Miles City, Mont.:</i>				
Black bass, largemouth			118,290	118,290
Sunfish			2,905	2,905
Catfish			85,735	85,735
Crappie			42,975	42,975
<i>Cape Vincent, N. Y.:</i>				
Brook trout			17,000	17,000
Lake trout	163,500	553,000		716,500
Landlocked salmon			8,000	8,000
Black bass, smallmouth			36,035	36,035
<i>Barneveld, N. Y.:</i>				
Brook trout			210,970	210,970
Lake trout			2,000	2,000
Loch Leven trout			47,500	47,500
Rainbow trout			56,100	56,100
<i>Cortland, N. Y.:</i>				
Brook trout			174,710	174,710
Lake trout			9,960	9,960
Loch Leven trout			52,360	52,360
Rainbow trout			84,930	84,930
<i>Watertown, N. Y.:</i>				
Brook trout			409,500	409,500
Lake trout			10,000	10,000
Loch Leven trout			36,200	36,200
Rainbow trout			2,200	2,200
<i>Carson, Wash.:</i>				
Chinook salmon		2,750,000	208,675	2,958,675
<i>Little White Salmon, Wash.:</i>				
Chinook salmon	3,000,000	5,376,000		8,376,000
<i>Big White Salmon, Wash.:</i>				
Chinook salmon	5,000	4,570,000	4,412,000	8,987,000
<i>Clackamas, Oreg.:</i>				
Brook trout			213,000	213,000
Chinook salmon			904,110	904,110
Silver salmon			103,370	103,370
<i>Battle Creek, Calif.:</i>				
Chinook salmon		980,000	6,618,575	7,598,575

NOTE.—Stations italicized are substations of the preceding station in roman type.

Stations and substations operated and the output of each, fiscal year 1938—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
<i>Mill Creek, Calif.:</i>				
Chinook salmon.....		8,932,150	-----	8,932,150
<i>Butte Falls, Oreg.:</i>				
Steelhead trout.....			305,000	305,000
Chinook salmon.....			1,408,000	1,408,000
Silver salmon.....			54,000	54,000
<i>Craig Brook, Maine:</i>				
Brook trout.....	2,028,000		283,805	2,311,805
Rainbow trout.....			21,000	21,000
Atlantic salmon.....			70,500	70,500
<i>Crawford, Nebr.:</i>				
Black-spotted trout.....			397,500	397,500
Brook trout.....			285,700	285,700
Loch Leven trout.....			49,000	49,000
Rainbow trout.....			376,995	376,995
Yellow perch.....			10,000	10,000
Black bass, largemouth.....			111,100	111,100
Rock bass.....			3,300	3,300
Sunfish.....			27,150	27,150
Catfish.....			106,275	106,275
Crappie.....			28,900	28,900
<i>Dexter, N. Mex.:</i>				
Black bass, largemouth.....			1,016,800	1,016,800
Sunfish.....			223,400	223,400
Catfish.....			25,490	25,490
Crappie.....			11,450	11,450
<i>Santa Rosa, N. Mex.:</i>				
Black bass, largemouth.....			64,000	64,000
Sunfish.....			61,000	61,000
Catfish.....			2,000	2,000
<i>Duluth, Minn.:</i>				
Brook trout.....			240,000	240,000
Lake trout.....	52,820	610,000	12,000	674,820
Loch Leven trout.....			71,750	71,750
Rainbow trout.....			7,500	7,500
Pike perch.....		33,690,000	-----	33,690,000
Lake herring.....		1,400,000	-----	1,400,000
Whitefish.....		3,750,000	-----	3,750,000
<i>Edenton, N. C.:</i>				
Black bass, largemouth.....		54,450	19,630	74,080
Sunfish.....			38,545	38,545
Catfish.....			200	200
Crappie.....			1,525	1,525
Glut herring.....		1,370,000	-----	1,370,000
Shad.....		7,085,000	-----	7,085,000
White perch.....		4,480,000	-----	4,480,000
<i>Weldon, N. C.:</i>				
Striped bass.....		415,000	-----	415,000
<i>Elephant Butte, N. Mex.:</i>				
Black bass, largemouth.....			118,000	118,000
Sunfish.....			22,000	22,000
<i>Erwin, Tenn.:</i>				
Brook trout.....			565,925	565,925
Rainbow trout.....			220,365	220,365
Black bass, largemouth.....		109,300	317,910	427,210
Black bass, smallmouth.....			850	850
Rock bass.....			4,200	4,200
Sunfish.....			28,100	28,100
<i>Fairport, Iowa:</i>				
Black bass, largemouth.....		59,000	109,680	168,680
Black bass, smallmouth.....			8,980	8,980
White bass.....			880	880
Sunfish.....			227,005	227,005
Catfish.....			20,000	20,000
Crappie.....			258,420	258,420
Buffalofish.....	43,332,500		444,400	43,776,900
Carp.....	37,200,000		181,000	37,381,000
Drum.....			235	235
Pike and pickerel.....			180	180
Miscellaneous fishes.....			22,350	22,350
<i>Flintville, Tenn.:</i>				
Rainbow trout.....			136,000	136,000
Black bass, largemouth.....			250	250
Black bass, smallmouth.....			5,650	5,650
Rock bass.....			15,600	15,600
Sunfish.....			44,800	44,800
<i>Fort Belvoir, Va.:</i>				
Yellow perch.....		329,475,000	200	329,475,200
Black bass, largemouth.....			2,590	2,590
Sunfish.....			18,025	18,025
Catfish.....			645	645
Crappie.....			745	745
Shad.....		15,000,000	-----	15,000,000
White perch.....			850	850

Stations and substations operated and the output of each, fiscal year 1938—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Gloucester, Mass.:				
Cod.....	1,600,687,960	152,465,100	-----	1,753,153,060
Flatfish.....	270,670,200	23,361,000	-----	294,031,200
Haddock.....	789,643,000	39,287,000	-----	828,930,000
Lobster.....	-----	1,183,330	-----	1,183,330
Pollock.....	1,761,951,000	257,399,000	-----	2,019,350,000
Hagerman, Idaho:				
Brook trout.....	-----	-----	200,500	200,500
Black-spotted trout.....	-----	-----	242,000	242,000
Rainbow trout.....	200,000	-----	721,100	921,100
Salmon, Idaho:				
Black-spotted trout.....	-----	-----	326,450	326,450
Rainbow trout.....	50,000	-----	594,160	644,160
Steelhead trout.....	-----	-----	44,820	44,820
Hartsville, Mass.:				
Black bass, smallmouth.....	-----	778,000	-----	778,000
Brook trout.....	-----	-----	282,300	282,300
Rainbow trout.....	-----	-----	15,000	15,000
Catfish.....	-----	-----	6,170	6,170
La Crosse, Wis.:				
Brook trout.....	-----	-----	529,000	529,000
Loch Leven trout.....	-----	-----	226,950	226,950
Rainbow trout.....	-----	-----	219,800	219,800
Black bass, largemouth.....	-----	-----	583,225	583,225
Sunfish.....	-----	-----	25,000	25,000
Catfish.....	-----	-----	1,500	1,500
Crappie.....	-----	-----	13,420	13,420
Bellevue, Iowa:				
Pike and pickerel.....	-----	-----	1,060	1,060
Yellow perch.....	-----	-----	605	605
Black bass, largemouth.....	-----	-----	60,895	60,895
White bass.....	-----	-----	1,815	1,815
Sunfish.....	-----	-----	544,800	544,800
Catfish.....	-----	-----	5,810,000	5,810,000
Crappie.....	-----	-----	1,132,500	1,132,500
Buffalofish.....	315,612,500	-----	886,000	316,498,500
Carp.....	268,000,000	-----	275,300	268,275,300
Drum.....	-----	-----	200	200
Miscellaneous fishes.....	-----	-----	390,000	390,000
Guttenburg, Iowa:				
Buffalofish.....	28,500,000	-----	-----	28,500,000
Carp.....	24,000,000	-----	-----	24,000,000
Homer, Minn.:				
Yellow perch.....	-----	-----	45,975	45,975
Black bass, largemouth.....	-----	-----	15,625	15,625
Sunfish.....	-----	-----	204,000	204,000
Catfish.....	-----	-----	53,690	53,690
Crappie.....	-----	-----	70,330	70,330
Lake Mills, Wis.:				
Brook trout.....	-----	-----	88,175	88,175
Loch Leven trout.....	-----	-----	44,330	44,330
Rainbow trout.....	-----	-----	78,150	78,150
Black bass, largemouth.....	-----	-----	88,800	88,800
Black bass, smallmouth.....	-----	-----	1,815	1,815
Crappie.....	-----	-----	500	500
Lynxville, Wis.:				
Pike and pickerel.....	-----	-----	7,525	7,525
Yellow perch.....	-----	-----	126,825	126,825
Black bass, largemouth.....	-----	-----	51,445	51,445
Sunfish.....	-----	-----	128,250	128,250
Buffalofish.....	-----	-----	1,514,700	1,514,700
Catfish.....	-----	-----	3,060,000	3,060,000
Crappie.....	-----	-----	107,940	107,940
Carp.....	-----	-----	2,170,000	2,170,000
Marquette, Iowa:				
Pike and pickerel.....	-----	-----	39,500	39,500
Yellow perch.....	-----	-----	36,200	36,200
Black bass, largemouth.....	-----	-----	387,330	387,330
White bass.....	-----	-----	43,200	43,200
Sunfish.....	-----	-----	3,488,135	3,488,135
Catfish.....	-----	-----	19,141,000	19,141,000
Crappie.....	-----	-----	5,272,350	5,272,350
Buffalofish.....	-----	-----	366,200	366,200
Carp.....	-----	-----	87,900	87,900
Lake Park, Ga.:				
Black bass, largemouth.....	-----	-----	22,085	22,085
Sunfish.....	-----	-----	275,650	275,650
Catfish.....	-----	-----	140,815	140,815
Warm Springs, Ga.:				
Black bass, largemouth.....	-----	258,350	65,150	323,500
Sunfish.....	-----	-----	239,500	239,500
Catfish.....	-----	-----	800	800

Stations and substations operated and the output of each, fiscal year 1938—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Lamar, Pa.:				
Loch Leven trout.....			37, 205	37, 205
Rainbow trout.....			65, 015	65, 015
Ogletown, Pa.:				
Brook trout.....			312, 985	312, 985
Leadville, Colo.:				
Black-spotted trout.....			734, 700	734, 700
Brook trout.....	1, 641, 000		2, 132, 510	3, 773, 510
Loch Leven trout.....			138, 120	138, 120
Rainbow trout.....			487, 300	487, 300
Creede, Colo.:				
Black-spotted trout.....			738, 000	738, 000
Brook trout.....	4, 260, 000		1, 489, 000	5, 749, 000
Loch Leven trout.....			47, 000	47, 000
Rainbow trout.....	480, 000		597, 100	1, 077, 100
Eagle Nest, N. Mex.:				
Black-spotted trout.....			228, 000	228, 000
Brook trout.....			36, 000	36, 000
Rainbow trout.....	900, 800		188, 000	1, 088, 800
Leetown, W. Va.:				
Brook trout.....			167, 985	167, 985
Loch Leven trout.....			19, 980	19, 980
Rainbow trout.....	15, 000		328, 545	343, 545
Black bass, largemouth.....			5, 080	5, 080
Black bass, smallmouth.....			2, 495	2, 495
Louisville, Ky.:				
Black bass, largemouth.....		21, 000	2, 835	23, 835
Black bass, smallmouth.....		386, 000	1, 140	387, 140
Rock bass.....			2, 625	2, 625
Sunfish.....			24, 935	24, 935
Crappie.....			850	850
Mammoth Springs, Ark.:				
Black bass, largemouth.....		40, 000	95, 000	135, 000
Black bass, smallmouth.....		215, 000	121, 000	336, 000
Rock bass.....			45, 000	45, 000
Sunfish.....			227, 300	227, 300
Manchester, Iowa:				
Brook trout.....	10, 000		366, 250	376, 250
Loch Leven trout.....			80, 700	80, 700
Rainbow trout.....	1, 200, 400		238, 985	1, 439, 385
Black bass, smallmouth.....			6, 500	6, 500
Rock bass.....			10, 000	10, 000
Marion, Ala.:				
Black bass, largemouth.....			550, 495	550, 495
Sunfish.....			1, 229, 040	1, 229, 040
Tupelo, Miss.:				
Black bass, largemouth.....		6, 500	404, 385	410, 885
Sunfish.....			196, 150	196, 150
Nashua, N. H.:				
Black bass, smallmouth.....			35	35
Brook trout.....			249, 100	249, 100
Loch Leven trout.....			6, 000	6, 000
Rainbow trout.....			9, 200	9, 200
Catfish.....			2, 550	2, 550
National Forest of N. H.:				
Brook trout.....	10, 927, 050	134, 000	457, 000	11, 518, 050
Lake trout.....			6, 075	6, 075
St. Johnsbury, Vt.:				
Brook trout.....		1, 513, 000		1, 513, 000
Loch Leven trout.....			1, 800	1, 800
Landlocked salmon.....			40, 245	40, 245
Black bass, smallmouth.....			3, 500	3, 500
Neosho, Mo.:				
Rainbow trout.....	2, 189, 100		15, 045	2, 204, 145
Black bass, largemouth.....		116, 000	12, 640	128, 640
Rock bass.....			2, 555	2, 555
Sunfish.....			78, 090	78, 090
Catfish.....			1, 600	1, 600
Crappie.....			51, 500	51, 500
Forest Park, Mo.:				
Black bass, largemouth.....			52, 525	52, 525
Sunfish.....			2, 020	2, 020
Natchitoches, La.:				
Black bass, largemouth.....		236, 400	135, 890	372, 290
Warmouth bass.....			8, 005	8, 005
Sunfish.....			458, 825	458, 825
Tishomingo, Okla.:				
Black bass, largemouth.....			336, 245	336, 245
Sunfish.....			272, 950	272, 950
Catfish.....			4, 550	4, 550
Crappie.....			21, 800	21, 800

Stations and substations operated and the output of each, fiscal year 1938—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
Northville, Mich.:				
Brook trout.....			595,950	595,950
Rainbow trout.....			167,665	167,665
Yellow perch.....			54,750	54,750
Black bass, largemouth.....			30,440	30,440
Black bass, smallmouth.....			56,795	56,795
Sunfish.....			31,470	31,470
Orangeburg, S. C.:				
Black bass, largemouth.....		25,500	276,965	302,465
Warmouth bass.....			2,735	2,735
Sunfish.....			198,280	198,280
Catfish.....			2,235	2,235
Crappie.....			12,745	12,745
Jacksonboro, S. C.:				
Shad.....		915,935		915,935
Hoffman, N. C.:				
Black bass, largemouth.....		56,000	19,000	75,000
Warmouth bass.....			53,000	53,000
Sunfish.....			402,755	402,755
Crappie.....			18,000	18,000
Pisgah Forest, N. C.:				
Brook trout.....			22,385	22,385
Loch Leven trout.....			12,570	12,570
Rainbow trout.....			39,845	39,845
Pittsford, Vt.:				
Brook trout.....			57,640	57,640
Rainbow trout.....			50,275	50,275
Grayling.....			10,000	10,000
Put-in-Bay, Ohio:				
Pike perch.....		103,330,000		103,330,000
Whitefish.....	450,000	70,800,000		71,280,000
Quinalt, Wash.:				
Black-spotted trout.....			312,120	312,120
Brook trout.....			16,525	16,525
Rainbow trout.....			70,120	70,120
Steelhead trout.....			89,490	89,490
Sockeye salmon.....			2,071,970	2,071,970
Duckabush, Wash.:				
Chinook salmon.....			14,585	14,585
Chum salmon.....		4,358,700		4,358,700
Humpback salmon.....		720,000		720,000
Quilcene, Wash.:				
Black-spotted trout.....			255,500	255,500
Brook trout.....			19,000	19,000
Steelhead trout.....			322,305	322,305
Chinook salmon.....			397,620	397,620
Chum salmon.....	5,070,000	2,011,685		7,081,685
Silver salmon.....		406,050	113,000	519,050
Sockeye salmon.....			531,335	531,335
Rochester, Ind.:				
Yellow perch.....			5,250	5,250
Black bass, largemouth.....			557,800	557,800
Black bass, smallmouth.....			50,190	50,190
Rock bass.....			14,100	14,100
Sunfish.....			220,525	220,525
Crappie.....			7,535	7,535
Rochester, N. Y.:				
Brook trout.....			10,515	10,515
Loch Leven trout.....			50,000	50,000
Rainbow trout.....			35,000	35,000
Black bass, largemouth.....			7,000	7,000
Black bass, smallmouth.....			23,000	23,000
Saratoga, Wyo.:				
Black-spotted trout.....	200,490		545,725	745,215
Brook trout.....			754,375	754,375
Loch Leven trout.....			73,280	73,280
Rainbow trout.....			376,765	376,765
Spearfish, S. Dak.:				
Black-spotted trout.....			44,000	44,000
Brook trout.....			595,710	595,710
Rainbow trout.....			375,300	375,300
Springville, Utah:				
Black-spotted trout.....	51,660		566,025	617,685
Brook trout.....			572,135	572,135
Loch Leven trout.....			173,000	173,000
Rainbow trout.....	1,250,940		798,435	2,049,375
Black bass, largemouth.....			250	250
Sunfish.....			490	490
Grayling.....	500,100			500,100

Stations and substations operated and the output of each, fiscal year 1938—Continued

Stations, substations, and species	Eggs	Fry	Fingerlings	Total
<i>Bear Lake, Utah:</i>				
Black-spotted trout.....			39, 750	39, 750
Brook trout.....			166, 100	166, 100
Lake trout.....			10, 025	10, 025
Rainbow trout.....			60, 050	60, 050
Sockeye salmon, landlocked.....			401, 200	401, 200
<i>Uvalde, Tex.:</i>				
Rio Grande perch.....			5, 260	5, 260
Black bass, largemouth.....		107, 100	235, 770	342, 870
Sunfish.....			14, 350	14, 350
<i>Fort Worth, Tex.:</i>				
Black bass, largemouth.....			114, 720	114, 720
Warmouth bass.....			400	400
Sunfish.....			13, 975	13, 975
Catfish.....			2, 590	2, 590
Crappie.....			32, 460	32, 460
<i>San Angelo, Tex.:</i>				
Black bass, largemouth.....		50, 000	50, 000	100, 000
Sunfish.....			2, 050	2, 050
<i>San Marcos, Tex.:</i>				
Rio Grande perch.....			24, 400	24, 400
Black bass, largemouth.....		172, 200	211, 555	383, 755
Sunfish.....			136, 470	136, 470
Crappie.....			5, 005	5, 005
<i>Walhalla, S. C.:</i>				
Brook trout.....			13, 200	13, 200
Rainbow trout.....			64, 725	64, 725
<i>Welaka, Fla.:</i>				
Black bass, largemouth.....		120, 000	180, 000	300, 000
<i>White Sulphur Springs, W. Va.:</i>				
Brook trout.....			1, 075, 855	1, 075, 855
Loch Leven trout.....			116, 200	116, 200
Rainbow trout.....	1, 196, 000		434, 620	1, 630, 620
Black bass, largemouth.....			2, 360	2, 360
<i>Woods Hole, Mass.:</i>				
Flatfish.....		452, 663, 000		452, 663, 000
<i>Wytheville, Va.:</i>				
Brook trout.....			545, 585	545, 585
Rainbow trout.....	1, 280, 000		361, 485	1, 641, 485
Pike perch.....		500, 000		500, 000
Black bass, largemouth.....			1, 885	1, 885
Black bass, smallmouth.....		20, 000	7, 640	27, 640
Rock bass.....			18, 700	18, 700
Sunfish.....			53, 500	53, 500
<i>Harrison Lake, Va.:</i>				
Black bass, largemouth.....			62, 265	62, 265
Sunfish.....			71, 850	71, 850
Catfish.....			1, 015	1, 015
Crappie.....			795	795
Shad.....		3, 140, 000		3, 140, 000
<i>Norris, Tenn.:</i>				
Black bass, largemouth.....			6, 500	6, 500
Sunfish.....			195, 000	195, 000
<i>Smokemont, N. C.:</i>				
Brook trout.....			66, 900	66, 900
Rainbow trout.....			90, 680	90, 680
<i>Yellowstone Park, Wyo.:</i>				
Black-spotted trout.....	23, 606, 785		5, 665, 600	29, 272, 385
Rainbow trout.....	479, 900			479, 900
Grayling.....	2, 285, 200	2, 862, 500		5, 147, 700
<i>Jackson, Wyo.:</i>				
Black-spotted trout.....		733, 000	457, 600	1, 190, 600
Brook trout.....			170, 020	170, 020
Lake trout.....			85, 440	85, 440

EGG COLLECTIONS

Egg collections during the fiscal year 1938 exceeded those of 1937 by approximately 70,000,000 eggs. As usual, the greater percentage of the collections comprised the four marine species; namely, cod, haddock, pollock, and flounder. The greater part of the eggs of these species is secured from fish caught by commercial fishermen. These eggs are fertilized and returned directly to the spawning grounds.

The recession in the take of Loch Leven trout eggs was due to the draining of the hydroelectric reservoir in the Madison Valley where these eggs are obtained.

The following table presents a comparison of the 1938 and 1937 collections:

Comparison of egg collections, fiscal years 1937 and 1938

Species	1937	1938	Species	1937	1938
Shad.....	20,034,000	27,523,000	Yellow perch.....	237,764,000	331,425,000
Whitefish.....	138,175,000	123,711,000	White perch.....		6,400,000
Chinook salmon.....	52,466,400	41,336,400	Cod.....	2,864,601,000	2,372,773,100
Chum salmon.....	22,383,000	16,187,000	Haddock.....	770,148,000	1,037,330,500
Silver salmon.....	2,193,000	1,300,000	Pollock.....	1,667,138,000	2,116,821,200
Sockeye salmon.....	7,653,000	3,180,000	Flatfish (flounder).....	1,639,143,000	1,402,749,000
Humpback salmon.....		5,111,000	Mackerel.....	12,300,000	
Rainbow trout.....	22,381,000	28,241,300	Lake herring.....	1,600,000	2,200,000
Black-spotted trout.....	35,131,100	31,048,500	Glut herring.....	24,220,000	2,960,000
Loch Leven trout.....	11,563,000	1,177,500	Striped bass.....	1,260,000	646,000
Lake trout.....	918,000	1,536,900	Carp.....	163,500,000	329,200,000
Brook trout.....	32,585,000	31,061,800	Buffalofish.....	329,250,000	387,445,000
Steelhead trout.....	2,377,400	1,588,800	Lobster.....		8,444,000
Grayling.....	3,715,000	5,837,000			
Pike perch.....	451,450,000	256,371,000	Total.....	8,513,948,900	8,573,605,000

NOTES ON OPERATIONS

COMMERCIAL SPECIES

Pacific salmon.—The output of chinook, chum, silver, and sockeye salmon from the Pacific coast hatcheries was below that of last year. This was due to the decline in the take of eggs. Humpback salmon were handled for the first time since 1934. At the Clackamas, Oreg., station, and its auxiliaries, more than 20,000,000 chinook salmon eggs were collected. The collections at Mill Creek and Battle Creek substations were practically quadrupled over last season. This was ascribed to heavy rains and high water during the entire season, permitting an unusually heavy run of fish. The acquisition of the Delph Creek rearing station by transfer from the Oregon State Game Department is proving to be a valuable addition to fish-cultural activities of the Clackamas, Oreg., station. Chinook salmon and brook trout were both reared at this point. The Butte Falls, Oreg., substation collected approximately 2,000,000 chinook salmon, 80,000 silver salmon, and 113,000 steelhead trout eggs. Two new residences are under construction at this point.

The Little White Salmon and Big White Salmon, Wash., substations were largely engaged in the propagation of chinook salmon. At the former station 9,775,000 eggs were collected, while at the latter 8,640,000. The take of eggs at both of these units was below that of last year, correlated, of course, with a reduction in the run of fish. Reestablishment of the Big White Salmon station was carried on under the auspices of the United States Army Engineers, as a part of the Bonneville Dam project. Buildings were moved and ponds rearranged.

In the Puget Sound territory the Birdsvew, Wash., station collected 6,700,000 salmon and trout eggs and received by transfer 1,280,000 eggs. These eggs comprised the five species of Pacific salmon and four varieties of trout. Gratifying results have been attained in establishing new runs of sockeye salmon where fingerling fish of this species were liberated during 1934 and 1935. The largest run of humpback salmon in the past 25 years occurred in the Skagit River and its tributaries during the fall of 1937.

No fish-cultural operations were carried on at the Baker Lake, Wash., substation. The salvaging of material from the hatchery building, which collapsed under heavy snow February 22, 1937, and the remodeling of the sawmill building into a hatchery, was carried on by C. C. enrollees. This station, which was formerly used for the propagation of salmon, will now be used for rearing trout to stock the waters of Mount Baker National Forest.

The Mount Rainier, Wash., substation collected and received from other stations approximately 1,000,000 trout eggs of various species. Most of the resulting fish were liberated in waters of Mount Rainier National Park and the Snoqualmie National Forest. From the rearing-ponds at Spokane, Wash., 300,000 large fingerling trout and graylings were distributed. Most of these fish were assigned to the Conservation Departments of Washington and Idaho.

In the Olympic Peninsula, the Quinault, Wash., hatchery collected 2,000,000 sockeye salmon eggs instead of the yearly average of 10,000,000 and reared the entire output of both salmon and trout to larger fingerlings before liberating them. The dam from which the hatchery receives its water supply was rebuilt.

The substations located at Duckabush and Quilcene, Wash., concentrated on the propagation of chum salmon, but a number of other species of salmon and trout were also handled. The steelhead trout run in the Duckabush River was very small and no effort was made to collect the eggs of this species.

MARINE SPECIES

The Woods Hole, Mass., station collected 506,824,000 winter flounder eggs and distributed 452,663,000 fry. In view of the favorable reports from previous plants of flounder fry in Long Island Sound and Narragansett Bay, a number of fry were planted in these waters, but the largest percentage were liberated in the coastal waters of Massachusetts. Several hundred feet of steam pipe between the boilerhouse and hatchery building was renewed. The Massachusetts Department of Conservation was allowed the use of space in the hatchery for the purpose of carrying on an experiment in the feeding and rearing of young lobsters. During June, 94,600 lobster fry were liberated.

At the Gloucester, Mass., station several spawn-takers were placed aboard commercial fishing vessels for the purpose of collecting haddock, pollock, cod, and flounder eggs. The total number of eggs taken exceeded 5,112,000,000, which was more than 16 percent over that of 1937. Of this number, slightly over 626,000,000 were propagated at the hatchery. The balance, after fertilization, were planted directly on the spawning grounds. The lobster-cultural work was carried on in cooperation with the Massachusetts Department of Conservation. From 273 seed lobsters approximately 2,503,000 eggs were taken and placed in hatching jars and 300,000 young lobsters in the fourth larval stage were liberated in Massachusetts coastal waters. Experiments in the feeding of fish instead of meat to lobster fry were carried on. Of the several kinds of fish fed, haddock seemed to be the most suitable.

The Boothbay Harbor, Maine, station collected cod, haddock, and flounder eggs. The eggs of the two former species were fertilized and

returned to the natural spawning grounds, while the flounder eggs were hatched with a loss of only about 10 percent. The number of eggs taken from adult flounders averaged approximately 243,000 per fish, but, due to the development of slime on the spawning grounds and the disappearance of eelgrass, the station was unable to collect as many spawners as heretofore. In cooperation with the Department of Sea and Shore Fisheries of Maine, lobster culture was continued. On account of the low water temperature, coupled with the cannibalistic tendencies of this crustacean, it has been a difficult task to hold the fry until they have reached the fourth stage. However, experiments are being conducted in the heating of the hatchery water. While it is too early to reach any definite conclusions it appears that by heating the water 12 to 15 degrees, lobsters can be reared to the fourth stage in 11 to 13 days with a loss of only about 50 percent, while about only 15 to 20 percent would reach this stage under natural water temperatures.

GREAT LAKES SPECIES

Except at the Put-in-Bay, Ohio, station, the propagation of commercial species of the Great Lakes continued on a restricted basis. As the closed season on lake trout was set ahead to October 1, the Duluth, Minn., station was unable to secure any eggs of this species from the early runs of fish. After the closed season some lake-trout eggs were received from the commercial fishermen, and the State of Michigan, but, due to the scarcity of fertile males at this time of the year, the percentage of hatch from these eggs was very low. There were 7,870,000 whitefish eggs handled during the season and 5,000,000 of this number were allotted by the State of Minnesota. More than 1,000,000 lake-herring fry were planted in the inland lakes of the Superior National Forest. The output of pike perch from the Duluth station was greatly increased over that of 1937. The propagation of this species was carried on in cooperation with the Minnesota Conservation Department, fish being liberated in the waters of that State. Of the 61,500,000 eggs handled, 50,000,000 were collected by the State. In addition to the propagation of the above commercial species, the station hatched Loch Leven, brook, and rainbow trout for the supplying of rearing stations in the national forests.

The collection of pike-perch eggs at the Put-in-Bay, Ohio, station was considerably below that of last season, as weather and water conditions were unfavorable during the entire spawning period. However, approximately 256,000,000 eggs were collected from the various fields. In addition to the pike-perch work, more than 120,000,000 whitefish eggs were handled. The propagation of both species was conducted on a joint basis with the State of Ohio.

The output of commercial species from the Cape Vincent, New York, hatchery was relatively insignificant. All whitefish and lake-trout eggs handled were received from local and Canadian fishermen with the exception of 500,000 lake-trout eggs received from the Province of Ontario in exchange for brook-trout eggs from the York Pond hatchery. There was no active work at the Swanton, Vt., substation which had previously handled pike perch and yellow perch.

To supplement the Cape Vincent output, rainbow, brook, and Loch Leven trout and smallmouth black bass were propagated. The

activities of this station with regard to its output of game fish and operation of its substations will be discussed elsewhere in this report.

ANADROMOUS SPECIES, ATLANTIC COAST

This is the first year since the early 1880's during which no Atlantic-salmon eggs were hatched. This was due to inability to secure eggs from Canada, coupled with the fact that there is no local source of supply of these eggs at any of our hatcheries. The Craig Brook, Maine, station liberated 77,500 fingerlings which were reared from eggs hatched in 1937.

The Fort Belvoir, Va., station increased its output of both shad and yellow perch. Approximately 330,000,000 yellow perch and 15,000,000 shad were liberated in the Potomac River and its tributaries. Two docks that were wrecked while the station grounds were inundated by the Potomac River were repaired and creosoted.

The Edenton, N. C., station reported the largest output of shad since the season of 1922. From 10,481,000 eggs more than 7,000,000 fry were hatched. All of these were planted in Albemarle Sound and its tributaries, with the exception of 581,000 which were placed in hatchery ponds for investigation and study. Fry placed in the ponds the latter part of April were 2 inches long the first part of July. Experiments in the rearing of striped bass were also carried on. The study of factors concerning the conservation of shad was continued in cooperation with the State of North Carolina. A total of 7,221,000 yellow perch, white perch, and herring fry were hatched and liberated in local waters. The station supplemented its work with commercial varieties by propagating pondfish for the stocking of inland waters. Under a W. P. A. project, six more ponds are being built and the present reservoir enlarged. Daphnia ponds and a new residence and garage are also being constructed with the cooperation of this agency.

The Weldon, N. C., station was again operated for the hatching of striped bass on a joint basis with the Conservation Department of North Carolina. The take of eggs was below that of 1937, but the percentage of hatch was much greater. The fry were strong and vigorous.

Supplementing its pondfish activities, the Orangeburg, S. C., station again operated the Jacksonboro shad hatchery located on the Edisto River. The total collection was in excess of 1,204,000 eggs. While this number is considerably below that of some of the better seasons, it does represent a substantial increase in production over the past several years.

GAME-FISH PROPAGATION

As reduction in the average working day allows more time for recreation, the number of man-days of angling is increasing rapidly. Consequently the demands upon State conservation departments and the Bureau for the furnishing of more and larger game fish for the restocking of inland lakes and streams have increased accordingly. Likewise, there is a big demand for the stocking of waters recently impounded by various Federal agencies such as the Soil Conservation Service, and the Bureau of Reclamation. The Bureau's entire out-

put of game fish could advantageously be utilized in the stocking of waters solely under Federal control. In fact, in some of the public lands, hatcheries are operated solely for the restocking of waters within the boundaries of such areas. Biological surveys have also been conducted in a number of public domains and stocking programs drawn up. In an effort to rear the output of fish to a larger size before liberating them, with the available funds, a number of experiments in the feeding of cheaper foods such as various types of meal, frozen fish, and offal from animals and fish have been carried on. Of the 92 Bureau hatcheries that were on a productive basis this season, all but 13 handled one or more species of game fish. However, most of these units are engaged solely in the propagation of game varieties. Strictly game and pan species distributed from these stations numbered 160,655,000 during the fiscal year, which was an increase of more than 34,000,000 over that of the previous season. There was a definite increase in the production of 11 different varieties of game fish. Included in these were the largemouth and smallmouth black bass and all the main varieties of trout except Loch Leven. The following data covering the activities of the individual stations will, however, give a better understanding of the nature of the season's work.

ROCKY MOUNTAIN TERRITORY

Inasmuch as the activities at the Yellowstone Park station continued into parts of 2 fiscal years, the following data cover the summer of 1937. All previous egg-collection records for blackspotted trout, Montana grayling, and rainbow trout were broken in this field. A grand total of 47,341,960 eggs was collected, of which number 70 percent were used to restock park waters. Electrical fences were used at several of the trap sites to protect adult trout from bears during the spawning season. All suckers caught in traps were utilized for fish food or destroyed. This season marked a new high in tourist travel in Yellowstone Park and fishing was reported better than during the previous year.

At the Springville, Utah, station, 2,672,000 rainbow eggs were collected from brood stock. This station also handled brook, black-spotted, and Loch Leven trout, grayling, and a limited number of pondfish.

The Bear Lake substation reported a normal production of five species of trout. W. P. A. employees were engaged in making various improvements to buildings, ponds, and grounds.

Although the Elephant Butte, N. Mex., station was incomplete, a good production of bass and sunfish was obtained from the few ponds in service.

The Dexter, N. Mex., station's output of pondfish exceeded that of any previous year, over 1¼ million fingerling fish being distributed. Most of these were handled by the New Mexico Department of Game and Fish under the same agreement as heretofore. Three small buildings were constructed, ponds excavated, and various other improvements made to station buildings, water-supply system, and grounds, under the auspices of W. P. A.

The output of the Santa Rosa, N. Mex., substation was limited because the ponds were too unproductive of food organisms to pro-

duce more than a nominal output of fish. Pond bottoms were fertilized at intervals to overcome this situation.

The water temperature at the Glacier Park, Mont., station was so low that all fish hatched from the 2,000,000 black-spotted-trout and 250,000 rainbow-trout eggs received from the Yellowstone Park were planted in the fry stage.

In the Montana field, the Bozeman station distributed approximately 4,000,000 fry and fingerling trout and grayling. The greater percentage of this output was utilized in restocking waters under Federal control. The experiment in the rearing of Montana grayling fry to fingerlings proved very successful. The following construction work was made possible by two W. P. A. projects: Three-stall addition to the garage, construction of two new concrete rearing ponds, painting of all buildings, graveling of driveways, cutting fire lanes through forest areas, laying of drains, and many miscellaneous repairs and improvements.

The collection of Loch Leven trout eggs in Madison Valley again fell to a new low. The Ennis, Mont., substation collected, at its four spawning camps, less than 400,000 eggs of this species. However, one-half million eggs of this variety were furnished this station by the Montana Department of Fish and Game for hatching, rearing, and planting in the Madison River and its tributaries in an effort to reestablish Loch Leven trout in this watershed. Although this station is in an incomplete status, approximately 5½ million eggs, fry, and fingerlings were distributed.

Considering the shortage of brood stock and the water levels of the lakes, the production of pondfish was satisfactory at the Miles City, Mont., substation. The output of bass was slightly lower than during the previous season but the difference in numbers was offset by the size of the fish. The production of catfish was in excess of any previous year in the history of the station.

In the Idaho territory, the Hagerman station reared its output of 1½ million trout to large fingerlings before releasing them. Extensive repairs and improvements, including the enlarging of the feed storage room, were made possible by assignment of W. P. A. employees.

The Salmon, Idaho, substation was operated during the summer months, in cooperation with the Idaho Fish and Game Department, as a base for handling the rainbow trout eggs collected at Williams Lake. The total collection for the season was slightly in excess of 4,000,000.

In the Colorado field, the Leadville station continued to cooperate with private parties in the collecting of trout eggs. The percentage the Bureau retains depends largely upon the manner in which the activities are carried on. However, the Bureau received several million eggs from such sources. The substation at Crystal Lake was utilized as a rearing unit. At the Eagle Nest, N. Mex., substation, which is operated during the summer months, approximately 2,000,000 rainbow-trout eggs were collected from Eagle Nest Lake by seining the beach for spawners. Owing to the large number of suckers ascending the creeks, this method of obtaining adult trout was necessary.

The Creede, Colo., substation collected 3,285,000 brook-trout eggs from Lake San Cristobal. These eggs were of excellent quality, eyeing up approximately 98 percent and producing vigorous and healthy fingerlings. There were 3,000,000 brook-trout eggs received from commercial trout dealers for eyeing or hatching on a cooperative basis.

The Bureau received a large quantity of eggs at a very small cost by such cooperative arrangements. A new electric-light plant was installed.

No major improvements were made at the Saratoga, Wyo., station, and the output of fish and eggs was practically the same as during the previous year.

At the Spearfish, S. Dak., station, over 1,258,000 rainbow- and 610,000 brook-trout eggs were collected from station brood stock, which is the largest collection ever made in the history of this unit. This station was again the beneficiary of a W. P. A. project which permitted the installation of several badly needed supply and drainage lines and the installation of five additional hot-water heaters for heating the water utilized in the hatching of eggs as a means of shortening the incubation period. N. Y. A. girls assigned acted in the capacity of guides showing visitors about the station and explaining the Bureau's work.

NEW ENGLAND TROUT STATIONS

The Nashua, N. H., station carried on its activities in a normal manner and achieved an average production of three species of trout.

Until the development of furunculosis the latter part of the year, the National Forest, N. H., station had the most successful year in its history. More than 14¼ million brook-trout eggs were collected, of which number approximately 10 million were shipped to State conservation departments and other Bureau stations. Extensive repairs and improvements were made with W. P. A. and C. C. C. labor. New water-supply lines were laid and several new ponds were constructed. A new electric generator was installed in the power plant. New Hampshire and Vermont contributed funds for the purchase of fish food in order that the fish could be reared to a larger size before liberation in the waters of their respective States. Gratifying results were obtained from the feeding of cheaper foods such as blood, beef brains, pork melts, horse meat, ground fish, fish spawn, and offal.

The York Pond station is so laid out that isolation of disease, such as furunculosis, is impossible. Accordingly, it was decided to destroy all fish on hand and sterilize the entire plant. Chlorine was selected as the most satisfactory and efficient agent for the purpose, and at the close of the year this distressing but necessary project was under way. None of the infected fish were planted, and if it is possible to eradicate completely a furunculosis infection the measures taken at York Pond will undoubtedly accomplish this result.

The major activity at the St. Johnsbury, Vt., station was the hatching and rearing of brook trout. Approximately 1½ million of this species were handled and also several thousand landlocked salmon, brown trout, and black bass. All three of the latter species were furnished by the State of Vermont. New cement raceways and cement bulkheads to ponds were constructed with W. P. A. labor. The hatchery foundation was also reconstructed during the year.

The Pittsford, Vt., station continued its experiments in selective breeding of trout. This season the breeders yielded eggs at the rate of 1,369 per pound of fish, which is 37 percent over the accepted rate per pound of trout. The general condition of the buildings and grounds was greatly improved by W. P. A. employees.

The Hartsville, Mass., station handled its normal quota of trout, of which several thousand were consigned to eight cooperative nurseries operating in Massachusetts and Vermont. There were 778,000 small-mouth black-bass fry collected from Wangum Lake in cooperation with the State of Connecticut under the same agreement as heretofore. Eight circular trout pools 22 feet in diameter are being constructed under the auspices of W. P. A.

In Maine the Craig Brook station collected $3\frac{1}{4}$ million brook-trout eggs, of which number approximately 2 million were shipped to other Bureau units. A limited number of rainbow and lake-trout fingerlings were distributed. The Acadia National Park was furnished 105,000 large fingerling fish to compensate them for the construction of circular rearing pools built at this station. The old plank conduit from the spring was replaced with a new iron soil-pipe line.

COMBINATION TROUT AND POND FISH STATIONS

Owing to the overlapping of the range of trout and warm-water species, such as bass, a number of hatcheries propagate both. However, most of the establishments in this category are principally concerned in the propagation of trout, and the output of pondfish is very limited.

At the Leetown, W. Va., station, a reservoir and 20 ponds, 50 feet wide and varying in length from 150 to 600 feet, were excavated. The concrete dam and outlet box for the reservoir and the necessary kettles for these ponds were also constructed. Several thousand trout 5 inches long were distributed, most of which were released in the waters of the Monongahela and George Washington National Forests. Experiments in the feeding of various kinds of food to adult trout were carried on in order to determine the effects of different diets upon the quality of the eggs. Experiments in the stocking of warm-water rearing ponds with blunt-nosed and black-head minnows and golden shiners were conducted for the purpose of determining how many of the above forage minnows should be stocked per acre of water.

The selective breeding of rainbow trout was continued at the Neosho, Mo., station. This selective breeding has accomplished one object in that during the last season more eyed rainbow eggs were produced from a smaller number of brood stock than in any previous year in the history of the station. The output of pondfish approximated the normal average. The culture of *daphnia magna* was successfully carried on during the spring months.

At the Bourbon, Mo., substation, operated on a cooperative basis, the production of rainbow-trout eggs was approximately 50 percent in excess of last season and 10 percent more than any previous year.

The pond system has never been completed at the Flintville, Tenn., station, consequently the propagation of pond species is limited. The output of trout was normal and sufficient to take care of the demands in that territory. N. Y. A. employees built picnic areas for the benefit of the visiting public.

The operations at the Erwin, Tenn., station were largely of a routine nature, and the production of trout and pondfish was comparable to that of last year.

The Cape Vincent, N. Y., station, and its substations at Cortland, Watertown, and Barneveld, contributed approximately 2 million trout

for the restocking of New York waters. The output of smallmouth black bass at Cape Vincent was 20 percent in excess of last season. Several cooperative nurseries, located throughout the State of New York, were supervised.

In addition to handling a limited number of pondfish, the White Sulphur Springs, W. Va., station distributed 1,600,000 trout. Most of these were planted in the waters of West Virginia in cooperation with the State Conservation Commission. W. P. A. employees were engaged in enlarging ponds and landscaping the surrounding grounds.

The Rochester, N. Y., station, which was operated in cooperation with Monroe County, reared the greater percentage of its output of trout to legal size before liberating them in waters under the control of the county park officials. Several thousand bass were also produced for the stocking of Monroe County waters.

In addition to a normal output of trout and pondfish, the Wytheville, Va., station received 525,000 pike-perch eggs and planted the resultant fry in New River. The propagation of largemouth black bass was discontinued. The pond space which was heretofore utilized for the handling of this species was used for rearing smallmouth black bass which are more in demand for the stocking of surrounding waters. Several thousand rainbow and brook-trout fingerlings were assigned to the States of North Carolina and Virginia.

At the Lamar, Pa., station, and its auxiliary at Ogletown, approximately one-half million trout were reared and released in the waters of western and central Pennsylvania. In order that this station can collect and hatch its own eggs, a hatchery building is being constructed. C. C. C. labor was utilized in the construction of this unit and the landscaping of the surrounding grounds. A site for bass ponds was cleared.

Five cooperative feeding stations, handling approximately 700,000 trout, were operated under the direction of the Northville, Mich., station. The output of pondfish was in excess of 100,000. At the close of the year a new wall between the spring reservoir and the highway was being constructed by W. P. A. employees.

The output of the Manchester, Iowa, station varied but little from that of last year. Of the $1\frac{1}{2}$ million rainbow trout eggs collected, approximately $1\frac{1}{4}$ million were shipped to other Bureau and State hatcheries. The output of pondfish was again very small. All station buildings were given two coats of paint by W. P. A. employees.

APPALACHIAN AND BLUE RIDGE TROUT STATIONS

As the Walhalla, S. C., station was incomplete at the beginning of the season, it was necessary to ship in trout from other points for rearing purposes. Consequently, only a limited number of trout were handled and they were planted in the waters of the national forests. The hatchery building was completed during the early fall which enabled this station to incubate eggs for the first time. There were 1,000,000 brook and rainbow trout eggs handled and, at the close of the year, there were on hand approximately 750,000 fish from these eggs. The Forest Service rearing stations at Franklin, N. C., and Clayton, Ga., are under the jurisdiction of this station.

The Smokemont, N. C., station, which is operated for stocking the Great Smoky Mountain National Park, reported a normal production

of brook and rainbow trout. At the close of the year 470,000 fingerling trout were being reared in various ponds throughout the park area for fall distribution.

The Pisgah Forest, N. C., station, operated solely for the stocking of waters in the Pisgah National Forest, reared the greater percentage of its output of trout to legal size before releasing them. However, considerable risk is taken in carrying fish through the winter at this station because of the probability of their succumbing to the effects of anchor ice. This station handled brook, rainbow, and brown trout.

PONDFISH STATIONS

The bass, sunfish, and other warm-water species are extremely prolific, but even in areas of their greatest natural abundance there is evidence of depletion. Intensive angling probably contributes most to this depletion. Consequently the demand for these species of fish is constantly increasing. In an effort to keep pace new units are being constructed, and pond acreage at a number of the old establishments is being extended. Additional pond space is the most essential factor for increasing the output of the warm-water species. However, the production is somewhat at the mercy of weather and other conditions over which there is no control.

Six ponds were constructed at the Marion, Ala., station, adding 22 acres of water to the pond system. Improvements were made in other ponds by removing dirt from shallow areas and utilizing it to reinforce levees. Three concrete pools were built for the purpose of propagating daphnia and holding fish during the distribution season. The metal tanks at the shipping shed were replaced with concrete ones. Weather conditions during the bass spawning season were more favorable than last year; consequently the output of this species was materially increased. A total of 752,050 bass were handled. The number of bream delivered to applicants was less than last year, but a greater poundage of this species was distributed, as the fish were practically twice as large. Efforts to propagate crappie and rock bass were largely unsuccessful.

There was no spring distribution at the Lyman, Miss., station. However, several thousand black bass fry were transferred to rearing ponds for fall distribution.

At the Tupelo, Miss., station a new drainage line was laid to four ponds. Over one-half million fingerling black bass and bream were distributed. This station's pond acreage is limited and the above figures represent a production of approximately 31,000 bass and 21,000 fingerling bream per acre.

The Division of Wild Life of the State of Georgia distributed most of the fish produced at both of the Georgia stations. The total production of largemouth black bass, sunfish, and catfish from these two units was practically the same as last season. Repairs were made to pond levees at both stations.

Despite the fact that the pond area at the Orangeburg, S. C., station was reduced, due to the construction of the concrete canal through the hatchery grounds and the reconditioning of pond bottoms, the production of fish, although less than that of last year, was on a level with the average yearly output. The greater portion of the crop was largemouth black bass and bluegill sunfish, but a limited number of

red-eared and redbreasted sunfish, crappie, catfish, and warmouth bass were distributed to applicants. In addition to the above, construction work was carried on. Station buildings were repaired and painted as a W. P. A. project.

Although the Hoffman, N. C., hatchery was under construction during the entire year, 11 one-acre ponds were completed and utilized for producing black bass, warmouth bass, sunfish, and crappie. The output from these ponds was 449,000, of which all were fingerlings except 56,000 bass fry. Many of these were utilized in stocking ponds and lakes of the land utilization project in which the hatchery is located.

The pond acreage at the Mammoth Spring, Ark., station was not increased but the output of fish was much greater than normal. The distribution of the four species propagated was in excess of 740,000. Smallmouth black bass fry were consigned to both the Arkansas and Missouri conservation departments.

At the Louisville, Ky., station the rehabilitation of buildings and grounds which were severely damaged by the 1937 flood was completed, including the excavation of a new pond. This station was favored with a W. P. A. project to assist in this work. The production of fish was below that of normal years but was in excess of that of the previous season. Brood stock was collected from local waters to replace that lost during the flood.

Although the Uvalde, Tex., station was under construction during the entire year, approximately one-half million black bass were produced and liberated in local waters.

The output from the San Marcos, San Angelo, and Forth Worth, Tex., substations was slightly in excess of that of last season.

The Welaka, Fla., station was received by transfer from the Farm Security Administration the latter part of the year. During the 3-month period that this unit was operated by the Bureau, 120,000 fry and 180,000 fingerling bass were distributed, most of which were released in the waters of the Ocala National Forest. Plans were laid for a general rebuilding of this establishment in order to make it conform to the Bureau's standards of design and construction. It is proposed to increase the pond area and construct a laboratory and other facilities. These facilities are required for research work in aquiculture which is to be undertaken here.

Fry were transferred to rearing ponds at the Palestine, W. Va., station, which is operated in cooperation with the West Virginia Conservation Commission. It is estimated that a total of 150,000 fish were on hand June 30.

The Norris, Tenn., hatchery, which is operated in cooperation with the Tennessee Valley Authority, liberated its output of fish in Norris Lake.

At the Harrison Lake, Va., station two additional ponds and a spillway to the reservoir were constructed. The output of fish was on a level with that of last year. However, efforts are being made to increase the production by planting aquatic plants in the ponds.

From the Tishomingo, Okla., station 635,500 fingerling fish were distributed. However, pond acreage at this point is not sufficient to produce enough fish to take care of all requests in that locality, and plans are being made to develop a new series of ponds.

Cold weather prevailed at the Natchitoches, La., station during the bass spawning season with consequent curtailment of the output of this species. The production of other pond species was increased and the total production was in excess of that of last season. Experiments in the propagation of spoonbill catfish were continued. The breeders appeared to be acclimated and are occasionally seen taking food, but no spawning activities were noticed.

MISSISSIPPI RIVER TERRITORY

The La Crosse, Wis., station is the headquarters for various activities of the Division in the Mississippi Valley. Rescue operations in the Upper Mississippi Wildlife and Fish Refuge were continued from Marquette, Guttenberg, Bellevue, Homer, and Fairport. A total of 43,194,485 fish was salvaged. The output of fish from the semicon-trolled ponds in this area was quite successful. The total production from these ponds was 988,470 fish, of which number 975,795 were black bass—the species that is most in demand.

Approximately 1,000,000 large fingerling rainbow, brook, and Loch Leven trout were distributed from the La Crosse station. Several thousand of these trout were consigned to 26 Wisconsin and 11 Minnesota cooperative nurseries and Forest Service rearing stations. A carload of specimens was collected in this area for the Bureau's aquarium in Washington, D. C., and the aquarium in New York City.

Construction activities were continued at Genoa in cooperation with the W. P. A. In addition to the excavating of ponds, a one and one-half story, five-room residence and garage were built.

The Homer, Minn., station is being developed as a supply depot for stations in that territory and is also being equipped to render shop service in the maintenance of automotive and vessel equipment. This does not interfere with rescue operations which are of short duration only.

Production of pondfish at the Fairport, Iowa, station was on a level with that of last year. Further experiments in the culture of spoonbill catfish were undertaken at this point also, but the results were negative. In addition to the salvaging of fish from nearby waters, carp and buffalofish eggs were obtained from commercial fishermen, fertilized, and planted upon the spawning grounds.

The Rochester, Ind., station established an all-time record in the production of pondfishes. This was due partly to the creation of additional pond space at this point as well as at the Argos auxiliary. The total output of all species from both sources was 1,001,760—an increase of 582,945 over the previous year. A large number of these fish were liberated in the waters from which the station had secured its brood stock. Daphnia culture for fish food was quite successful during the spring months. The office building was completed and all buildings were painted. At the close of the year additional ponds were being built and the creek riprapped, under the auspices of the W. P. A.

The production of bass at the Lake Mills, Wis., station was approximately double that of the previous year. Trout culture was normal, 200,000 fingerlings being distributed for the stocking of waters in that locality. Three large and seven small ponds were excavated and the surrounding grounds were landscaped. This construction work was carried on with W. P. A. labor.

AQUARIUM

The displays of fresh-water food, game, forage, and predatory fish, maintained in the public aquarium of the Department of Commerce, have continued to be a magnet of public attraction. The number of specimens shown has ranged from 1,500 to 2,000. Included among these were a number of the showy tropical species which are so popular for home aquaria. As heretofore, demonstrations of model hatchery apparatus and methods were displayed, utilizing eggs of salmon, trout, whitefish, shad, and yellow perch in season.

A gradually increasing percentage of chlorine used in the District of Columbia water supply is threatening to limit the survival of the more delicate forms. Consideration is being given to the installation of dechlorination equipment.

There was acquired a series of portable aquaria which could be utilized in handling small exhibits of live fishes which might be required for educational or conservation exhibits away from the main aquarium.

As usual, the Bureau's hatcheries were drawn on freely as a source of aquarium specimens, and the distribution cars and trucks were utilized for transporting them. Consequently, the operating costs of this establishment were held at a low level in comparison with the normally heavy costs of operating such a public institution.

DISTRIBUTION OPERATIONS

A greater number of requests for consignments of fish were received this year from individuals and clubs than for several years previous, the total being 10,723. This does not include a number of blanket applications from the national forests, national parks, and other Government agencies, upon which hundreds of thousands of fish were assigned.

The distribution cars engaged in the delivery of fish to applicants this year made 91 trips and carried an average of 260 pails per trip. In making this distribution the cars traveled 60,255 paid miles and 12,307 free miles. Detached messengers traveled 68,336 paid miles and 11,022 free miles in delivering fish to applicants. As heretofore, the Bureau was favored with free transportation and reduced rates by a number of railroads. The distributing of fish by trucks, within a comparatively short radius of our hatcheries, is becoming more prevalent each year. Truck deliveries during the year aggregated 245,000 miles, which was more than double that of last year. The Bureau received the cooperation of several State conservation departments in distributing the fish produced at our hatcheries to applicants in their respective States.

Unfortunately, due to limited distribution funds, the practice of asking applicants in some localities to call at our hatcheries to receive their allotments of fish had to be continued. This, however, was not always practicable from the applicants' standpoint, and in such cases the uncalled-for fish were either assigned to State conservation departments or planted in public waters.

Summary, by States, of the distribution of fish, fiscal year 1938

State and species	Number	State and species	Number
Alabama:		Iowa—Continued.	
Rainbow trout.....	31,500	Carp.....	363,200
Largemouth black bass.....	523,815	Drum.....	200
Rock bass.....	3,000	Pike and pickerel.....	40,560
Sunfish.....	844,885	Yellow perch.....	34,205
Catfish.....	340	Miscellaneous fishes.....	464,000
Arizona:		Kansas:	
Largemouth black bass.....	51,500	Rainbow trout.....	1,765
Sunfish.....	17,000	Largemouth black bass.....	15,760
Catfish.....	2,900	Sunfish.....	23,980
Arkansas:		Catfish.....	7,255
Rainbow trout.....	2,425	Crappie.....	12,900
Largemouth black bass.....	125,180	Kentucky:	
Smallmouth black bass.....	208,000	Largemouth black bass.....	2,025
Rock bass.....	35,500	Smallmouth black bass.....	196,500
Sunfish.....	245,850	Rock bass.....	2,025
Crappie.....	5,600	Sunfish.....	65,125
California: Chinook salmon.....	16,921,725	Crappie.....	850
Colorado:		Louisiana:	
Black-spotted trout.....	1,566,950	Largemouth black bass.....	374,819
Brook trout.....	3,670,455	Warmouth bass.....	8,005
Loch Leven trout.....	585,200	Sunfish.....	424,825
Rainbow trout.....	1,206,080	Maine:	
Largemouth black bass.....	55,025	Brook trout.....	548,905
Sunfish.....	5,750	Lake trout.....	12,800
Crappie.....	4,750	Loch Leven trout.....	6,000
Connecticut: Brook trout.....	10,500	Rainbow trout.....	23,000
Delaware: Largemouth black bass.....	200	Smallmouth black bass.....	16,000
Florida:		Flounder.....	534,600,000
Largemouth black bass.....	305,570	Lobster.....	11,048,150
Sunfish.....	8,775	Atlantic salmon.....	70,500
Georgia:		Chinook salmon.....	20,000
Brook trout.....	5,000	Landlocked salmon.....	39,890
Rainbow trout.....	43,400	Maryland:	
Largemouth black bass.....	328,345	Brook trout.....	2,450
Smallmouth black bass.....	190,200	Loch Leven trout.....	1,370
Sunfish.....	530,050	Rainbow trout.....	8,990
Catfish.....	128,660	Largemouth black bass.....	25,590
Crappie.....	500	Sunfish.....	65,625
Idaho:		Catfish.....	130
Black-spotted trout.....	605,200	Crappie.....	3,535
Brook trout.....	282,500	Yellow perch.....	844,000
Loch Leven trout.....	41,400	Massachusetts:	
Rainbow trout.....	1,428,360	Brook trout.....	223,900
Steelhead trout.....	44,820	Rainbow trout.....	17,950
Grayling.....	58,000	Black bass.....	564,500
Illinois:		Catfish.....	8,570
Loch Leven trout.....	248,340	Cod.....	152,434,500
Largemouth black bass.....	38,875	Flounder.....	292,049,690
Rock bass.....	4,000	Haddock.....	39,287,000
White bass.....	980	Lobster.....	1,183,330
Sunfish.....	96,400	Pollock.....	257,399,000
Catfish.....	52,630	Michigan:	
Crappie.....	248,340	Brook trout.....	682,375
Buffalo fish.....	444,400	Loch Leven trout.....	62,150
Carp.....	181,200	Largemouth black bass.....	65,305
Drum.....	235	Smallmouth black bass.....	25,585
Pickerel.....	180	Sunfish.....	50,095
Miscellaneous fishes.....	22,350	Catfish.....	150
Indiana:		Crappie.....	13,700
Brook trout.....	117,075	Yellow perch.....	55,875
Loch Leven trout.....	45,000	Whitefish.....	2,850,000
Rainbow trout.....	150,975	Rainbow trout.....	104,240
Yellow perch.....	3,450	Minnesota:	
Largemouth black bass.....	651,620	Brook trout.....	352,950
Smallmouth black bass.....	35,670	Lake trout.....	622,000
Rock bass.....	10,700	Loch Leven trout.....	23,400
Sunfish.....	167,325	Rainbow trout.....	47,500
Crappie.....	6,335	Largemouth black bass.....	227,605
Iowa:		Smallmouth black bass.....	1,500
Brook trout.....	20,000	Sunfish.....	183,600
Loch Leven trout.....	3,000	Catfish.....	34,770
Rainbow trout.....	48,235	Crappie.....	71,050
Largemouth black bass.....	375,530	Pike perch.....	36,390,000
Smallmouth black bass.....	14,400	Yellow perch.....	43,650
Rock bass.....	2,000	Lake herring.....	1,400,000
White bass.....	79,015	Whitefish.....	900,000
Sunfish.....	4,014,865	Mississippi:	
Catfish.....	24,929,695	Largemouth black bass.....	362,920
Crappie.....	5,541,570	Sunfish.....	374,425
Buffalo fish.....	2,449,500	Crappie.....	800

Summary, by States, of the distribution of fish, fiscal year 1938—Continued

State and species	Number	State and species	Number
Missouri:		Ohio:	
Rainbow trout.....	10,520	Brook trout.....	5,000
Largemouth black bass.....	253,840	Loch Leven trout.....	500
Smallmouth black bass.....	100,000	Rainbow trout.....	104,575
Rock bass.....	13,755	Largemouth black bass.....	63,265
Catfish.....	2,280	Smallmouth black bass.....	8,025
Sunfish.....	128,030	Rock bass.....	8,000
Crappie.....	39,100	Crappie.....	8,350
Montana:		Catfish.....	23,750
Black-spotted trout.....	5,866,350	Pike perch.....	103,330,000
Brook trout.....	441,910	Sunfish.....	104,575
Loch Leven trout.....	87,500	Yellow perch.....	2,625
Rainbow trout.....	1,664,165	Whitefish.....	70,800,000
Largemouth black bass.....	80,565	Oklahoma:	
Grayling.....	550,420	Rainbow trout.....	575
Sunfish.....	1,625	Largemouth black bass.....	303,735
Catfish.....	78,230	Sunfish.....	262,975
Crappie.....	26,380	Catfish.....	3,600
Nebraska:		Crappie.....	23,900
Brook trout.....	65,800	Oregon:	
Loch Leven trout.....	24,000	Brook trout.....	350,700
Rainbow trout.....	186,070	Rainbow trout.....	6,000
Largemouth black bass.....	30,350	Steelhead trout.....	305,000
Sunfish.....	25,300	Chinook salmon.....	2,881,700
Catfish.....	6,750	Silver salmon.....	157,370
Crappie.....	24,800	Pennsylvania:	
Yellow perch.....	2,000	Brook trout.....	424,390
Nevada:		Loch Leven trout.....	139,980
Brook trout.....	40,595	Rainbow trout.....	187,435
Rainbow trout.....	289,720	Largemouth black bass.....	26,150
Sunfish.....	60	Smallmouth black bass.....	1,075
New Hampshire:		Sunfish.....	34,000
Brook trout.....	437,125	Catfish.....	1,775
Lake trout.....	1,075	Rhode Island:	
Loch Leven trout.....	6,000	Brook trout.....	1,000
Rainbow trout.....	9,000	Smallmouth black bass.....	10,000
Smallmouth black bass.....	35	Flounder.....	68,272,000
Catfish.....	150	South Carolina:	
New Jersey:		Brook trout.....	3,100
Rainbow trout.....	240	Rainbow trout.....	29,725
Largemouth black bass.....	11,900	Largemouth black bass.....	302,155
Smallmouth black bass.....	270	Warmouth bass.....	2,735
Sunfish.....	4,600	Sunfish.....	224,770
Catfish.....	30	Catfish.....	2,335
New Mexico:		Crappie.....	11,545
Black-spotted trout.....	214,000	Shad.....	915,930
Brook trout.....	36,000	South Dakota:	
Rainbow trout.....	168,000	Black-spotted trout.....	44,000
Largemouth black bass.....	1,246,850	Brook trout.....	480,710
Sunfish.....	300,000	Rainbow trout.....	351,000
Catfish.....	25,390	Largemouth black bass.....	60,730
Crappie.....	11,000	Sunfish.....	27,100
New York:		Catfish.....	61,200
Brook trout.....	818,765	Crappie.....	18,520
Lake trout.....	624,965	Tennessee:	
Loch Leven trout.....	180,010	Brook trout.....	536,620
Rainbow trout.....	187,510	Rainbow trout.....	380,620
Largemouth black bass.....	7,000	Largemouth black bass.....	415,865
Smallmouth black bass.....	168,610	Smallmouth black bass.....	5,870
Flounder.....	121,160,000	Rock bass.....	15,000
North Carolina:		Sunfish.....	304,400
Brook trout.....	388,500	Crappie.....	1,200
Loch Leven trout.....	22,470	Yellow perch.....	1,800
Rainbow trout.....	183,510	Texas:	
Largemouth black bass.....	227,730	Loch Leven trout.....	10,000
Smallmouth black bass.....	850	Largemouth black bass.....	988,320
Rock bass.....	1,800	Warmouth bass.....	400
Striped bass.....	415,000	Sunfish.....	29,660
Warmouth bass.....	53,500	Catfish.....	2,590
Sunfish.....	460,795	Crappie.....	36,555
Catfish.....	500	Utah:	
Crappie.....	19,525	Black-spotted trout.....	1,256,025
Yellow perch.....	1,571,055	Brook trout.....	545,640
White perch.....	4,480,000	Lake trout.....	10,020
Glut herring.....	1,370,000	Loch Leven trout.....	173,000
Shad.....	7,085,000	Rainbow trout.....	726,225
North Dakota:		Largemouth black bass.....	250
Rainbow trout.....	20,000	Grayling.....	500,000
Largemouth black bass.....	31,915	Landlocked salmon.....	401,200
Sunfish.....	19,510	Vermont:	
Catfish.....	1,050	Brook trout.....	371,465
Crappie.....	26,375	Lake trout.....	10,000

Summary, by States, of the distribution of fish, fiscal year 1938—Continued

State and species	Number	State and species	Number
Vermont—Continued.		West Virginia—Continued.	
Loch Leven trout.....	1,800	Rainbow trout.....	527,355
Rainbow trout.....	19,105	Largemouth black bass.....	30,000
Largemouth black bass.....	2,000	Smallmouth black bass.....	10,965
Smallmouth black bass.....	31,500	Sunfish.....	4,750
Grayling.....	10,000	Catfish.....	2,000
Landlocked salmon.....	48,245	Crappie.....	5,100
Virginia:		Yellow perch.....	500
Brook trout.....	522,920	Wisconsin:	
Rainbow trout.....	573,355	Brook trout.....	558,175
Largemouth black bass.....	24,220	Loch Leven trout.....	218,230
Smallmouth black bass.....	63,255	Rainbow trout.....	311,800
Rock bass.....	17,700	Largemouth black bass.....	483,695
Sunfish.....	89,990	Smallmouth black bass.....	2,015
Crappie.....	1,840	Sunfish.....	131,575
Pike perch.....	500,000	Catfish.....	3,074,920
Yellow perch.....	328,631,000	Crappie.....	163,160
Shad.....	18,140,000	Buffalofish.....	1,534,700
Washington:		Carp.....	2,170,000
Black-spotted trout.....	1,920,620	Pike and pickerel.....	7,525
Brook trout.....	720,690	Yellow perch.....	7,500
Golden trout.....	255	Wyoming:	
Steelhead trout.....	1,251,795	Black-spotted trout.....	7,327,495
Largemouth black bass.....	28,360	Brook trout.....	1,170,890
Sunfish.....	1,280	Lake trout.....	138,260
Crappie.....	1,600	Loch Leven trout.....	88,200
Chinook salmon.....	18,554,859	Rainbow trout.....	572,940
Chum salmon.....	6,370,385	Largemouth black bass.....	55,050
Humpback salmon.....	4,584,000	Sunfish.....	650
Silver salmon.....	742,050	Catfish.....	34,950
Sockeye salmon.....	3,079,505	Crappie.....	1,800
West Virginia:		Grayling.....	2,263,000
Brook trout.....	752,405	Yellow perch.....	8,000
Loch Leven trout.....	78,640		